FLY280

AT Command User Guide

Flyscale Technology

Flyscale Technologies Co., Ltd

Preface

Scope of this document

This document describes the AT-command based messages exchanged between an application and the FLY280 module in order to manage GSM related events or services.

Content introduction:

There are eleven chapters in the document:

The 1st chapter is the introduction provides general information on the AT command (or response) behaviour.
From the 2nd chapter to the 11st chapter describes the way to use them, the possible answers, through a readable format.

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Chapter 1. Introduction

1.1 Introduction

This document describes the AT-command based on messages exchangs between an application and FLY280 module in order to manage GSM related events or services.

1.2 Related documents

ETSI GSM 07.05:
Digital cellular telecommunications system (Phase 2+);
Use of Data Terminal Equipment - Data Circuit terminating;
Equipment (DTE - DCE) interface for Short Message Service (SMS) and
Cell Broadcast Service (CBS)
(GSM 07.05 version 7.0.1 Release 1998)

ETSI GSM 07.07:
Digital cellular telecommunications system (Phase 2+); AT command set for GSM Mobile Equipment (ME) (GSM 07.07 version 7.5.0 Release 1998)

ITU-T Recommendation V.25 ter:
Serial asynchronous automatic dialing and control

ETSI GSM 03.40:
Digital cellular telecommunications system (Phase 2+); Technical realization of the Short Message Service (SMS); (GSM 03.40 version 7.4.0 Release 1998)

ETSI GSM 03.38:
Digital cellular telecommunications system (Phase 2+);
Alphabets and language-specific information
(GSM 03.38 version 7.2.0 Release 1998)

ETSI GSM 04.80:
Digital cellular telecommunications system (Phase 2+);
Mobile radio interface layer 3 supplementary services specification; Formats and coding
(GSM 04.80 version 7.1.0 Release 1998)

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1.3 Line settings

FLY280 line settings:

A serial link handler is set with the following default values (factory settings): baud rate is 115200BPS, 8 bits data, 1 stop bit, no parity, no flow control.

1.4 Command line

Commands always start with AT (which means Attention) and finish with a <CR> character.

1.5 Information responses and result codes

Information responses and result codes

Responses start and end with <CR><LF>

If command syntax is incorrect, the "ERROR" string is returned,.

If command syntax is correct but transmitted with wrong parameters, the +CME ERROR: <Err> or +CMS ERROR: <SmsErr> strings is returned with adequate error codes if CMEE was previously set to 1. By default, CMEE is set to 0, and the error message is only "ERROR".

If the command line has been executed successfully, an "OK" string is returned.

In some cases, such as "AT+CPIN?" or (unsolicited) incoming events, the product does not return the "OK" string as a response.

The following table shows the error number and detailed description.

NO.	Error number	Description
1	+CME ERROR:0	+CME ERROR: phone failure
2	+CME ERROR:1	+CME ERROR: no connection to phone
3	+CME ERROR:2	+CME ERROR: phone-adaptor link reserved
4	+CME ERROR:3	+CME ERROR: operation not allowed
5	+CME ERROR:4	+CME ERROR: operation not supported
6	+CME ERROR:5	+CME ERROR: PH-SIM PIN required
7	+CME ERROR:6	+CME ERROR: PH-FSIM PIN required
8	+CME ERROR:7	+CME ERROR: PH-FSIM PUK required

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9	+CME ERROR:10	+CME ERROR: SIM not inserted
10	+CME ERROR:11	+CME ERROR: SIM PIN required
11	+CME ERROR:12	+CME ERROR: SIM PUK required
12	+CME ERROR:13	+CME ERROR: SIM failure
13	+CME ERROR:14	+CME ERROR: SIM busy
14	+CME ERROR:15	+CME ERROR: SIM wrong
15	+CME ERROR:16	+CME ERROR: incorrect password
16	+CME ERROR:17	+CME ERROR: SIM PIN2 required
17	+CME ERROR:18	+CME ERROR: SIM PUK2 required
18	+CME ERROR:20	+CME ERROR: memory full
19	+CME ERROR:21	+CME ERROR: invalid index
20	+CME ERROR:22	+CME ERROR: not found
21	+CME ERROR:23	+CME ERROR: memory failure
22	+CME ERROR:24	+CME ERROR: text string too long
23	+CME ERROR:25	+CME ERROR: invalid characters in text string
24	+CME ERROR:26	+CME ERROR: dial string too long
25	+CME ERROR:27	+CME ERROR: invalid characters in dial string
26	+CME ERROR:28	+CME ERROR: GPRS operation failure
27	+CME ERROR:29	+CME ERROR: GPRS send data failure
28	+CME ERROR:30	+CME ERROR: no network service
29	+CME ERROR:31	+CME ERROR: network timeout
30	+CME ERROR:32	+CME ERROR: network not allowed-emergency calls only
31	+CME ERROR:40	+CME ERROR: network personalisation PIN required
32	+CME ERROR:41	+CME ERROR: network personalisation PUK required
33	+CME ERROR:42	+CME ERROR: network subset personalisation PIN required
34	+CME ERROR:43	+CME ERROR: network subset personalisation PUK required
35	+CME ERROR:44	+CME ERROR: service provider personalisation PIN required

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36	+CME ERROR:45	+CME ERROR: service provider personalisation PUK required
37	+CME ERROR:46	+CME ERROR: corporate personalisation PIN required
38	+CME ERROR:47	+CME ERROR: corporate personalisation PUK required
39	+CME ERROR:60	+CME ERROR: AT command discarded
40	+CME ERROR:62	+CME ERROR: SIM card reject by network
41	+CME ERROR:63	+CME ERROR: SIM card service not available
42	+CME ERROR:64	+CME ERROR: SIM card PIN uninitialized
43	+CME ERROR:65	+CME ERROR: SIM card PIN blocked
44	+CME ERROR:66	+CME ERROR: SIM card PUK blocked
45	+CME ERROR:100	+CME ERROR: unknown
46	+CME ERROR:103	+CME ERROR: Illegal MS (#3)
47	+CME ERROR:106	+CME ERROR: Illegal ME (#6)
48	+CME ERROR:107	+CME ERROR: GPRS services not allowed (#7)
49	+CME ERROR:111	+CME ERROR: PLMN not allowed (#11)
50	+CME ERROR:112	+CME ERROR: Location area not allowed (#12)
51	+CME ERROR:113	+CME ERROR: Roaming not allowed in this location area (#13)
52	+CME ERROR:132	+CME ERROR: Service option not supported (#32)
53	+CME ERROR:133	+CME ERROR: Request service option not subscribed (#33)
54	+CME ERROR:134	+CME ERROR: Service option temprarily out of order(#34)
55	+CME ERROR:149	+CME ERROR: PDP authentication failure
56	+CME ERROR:533	+CME ERROR: Missing or unkown apn

Form 1-1

Form 1-2 shows the error number and detailed description about short message.

NO.	Error number	Description
1	+CME ERROR:301	+ CMS ERROR: SMS service of ME reserved
2	+CME ERROR:302	+ CMS ERROR: Operation not allowed

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3	+CME ERROR:303	+ CMS ERROR: Operation not supported
4	+CME ERROR:304	+ CMS ERROR: Invalid PDU mode parameter
5	+CME ERROR:305	+ CMS ERROR: Invalid text mode parameter
6	+CME ERROR:310	+ CMS ERROR: SIM not inserted
7	+CME ERROR:311	+ CMS ERROR: SIM PIN required
8	+CME ERROR:312	+ CMS ERROR: SIM failure
9	+CME ERROR:313	+ CMS ERROR: SIM PUK required
10	+CME ERROR:316	+ CMS ERROR: SIM PIN2 required
11	+CME ERROR:317	+ CMS ERROR: SIM PUK2 required
12	+CME ERROR:318	+ CMS ERROR: SIM failure
13	+CME ERROR:321	+ CMS ERROR: Invalid memory index
14	+CME ERROR:322	+ CMS ERROR: SIM memory full
15	+CME ERROR:330	+ CMS ERROR: SC address unknown
16	+CME ERROR:334	+ CMS ERROR: no +CNMA acknowledgement expected

Form 1-2

NO.	Error number	Description
1	+CEER ERROR:0	+CEER ERROR:no detail information
2	+CEER ERROR:1	+CEER ERROR:unassigned number
3	+CEER ERROR:3	+CEER ERROR:no route to destination
4	+CEER ERROR:6	+CEER ERROR:unacceptable channel
5	+CEER ERROR:8	+CEER ERROR:operator determinate barring
6	+CEER ERROR:16	+CEER ERROR:normal clearing
7	+CEER ERROR:17	+CEER ERROR:user busy
8	+CEER ERROR:18	+CEER ERROR:no user responding
9	+CEER ERROR:19	+CEER ERROR:alerting no answer
10	+CEER ERROR:21	+CEER ERROR:call rejected
11	+CEER ERROR:22	+CEER ERROR:number changed
12	+CEER ERROR:26	+CEER ERROR:nonselect user clearing
13	+CEER ERROR:27	+CEER ERROR:destination out of order
14	+CEER ERROR:28	+CEER ERROR:invalid number format
15	+CEER ERROR:29	+CEER ERROR:facility rejected
16	+CEER ERROR:30	+CEER ERROR:response to status query

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17	+CEER ERROR:31	+CEER ERROR:normal unspecified
18	+CEER ERROR:34	+CEER ERROR:no circuit channel available
19	+CEER ERROR:38	+CEER ERROR:net out of order
20	+CEER ERROR:41	+CEER ERROR:temporary failure
21	+CEER ERROR:42	+CEER ERROR:switch congestion
22	+CEER ERROR:43	+CEER ERROR:access information discarded
23	+CEER ERROR:44	+CEER ERROR:request circuit channel
24	+CEER ERROR:47	+CEER ERROR:resources unavailable
25	+CEER ERROR:49	+ CEER ERROR: QOS unavailable
26	+CEER ERROR:50	+ CEER ERROR: request facility not subscribe
27	+CEER ERROR:55	+ CEER ERROR: CUG incoming barred
28	+CEER ERROR:57	+ CEER ERROR: bear capability not authorization
29	+CEER ERROR:58	+ CEER ERROR: bear capability unavailable
30	+CEER ERROR:63	+ CEER ERROR: service unavailable
31	+CEER ERROR:65	+ CEER ERROR: bear service not implement
32	+CEER ERROR:68	+ CEER ERROR: ACM equal or great ACMMAX
33	+CEER ERROR:69	+ CEER ERROR: request facility not implement
34	+CEER ERROR:70	+ CEER ERROR: only restrict digital available
35	+CEER ERROR:79	+ CEER ERROR: service option not implement
36	+CEER ERROR:81	+ CEER ERROR: invalid ti
37	+CEER ERROR:87	+ CEER ERROR: user not in CUG
38	+CEER ERROR:88	+ CEER ERROR: incompatibility destination
39	+CEER ERROR:91	+ CEER ERROR: invalid transit net
40	+CEER ERROR:95	+ CEER ERROR: invalid message semantic
41	+CEER ERROR:96	+ CEER ERROR: mandatory IE error
42	+CEER ERROR:97	+ CEER ERROR: message nonexistent
43	+CEER ERROR:98	+ CEER ERROR: message uncompatbility error
44	+CEER ERROR:99	+ CEER ERROR: IE nonexistent
45	+CEER ERROR:100	+ CEER ERROR: invalid condition IE
46	+CEER ERROR:101	+ CEER ERROR: message incompatibility state
47	+CEER ERROR:102	+ CEER ERROR: recover on timer
48	+CEER ERROR:111	+ CEER ERROR: protocol error
49	+CEER ERROR:127	+ CEER ERROR: interworking
50	+CEER ERROR:150	+ CEER ERROR: authentication rejected
51	+CEER ERROR:151	+ CEER ERROR: emergency call only
52	+CEER ERROR:152	+ CEER ERROR: IMSI detach

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53	+CEER ERROR:153	+ CEER ERROR: T3230 expiry
54	+CEER ERROR:154	+ CEER ERROR: rr connection error
55	+CEER ERROR:171	+ CEER ERROR: no network service
56	+CEER ERROR:172	+ CEER ERROR: emergency call only
57	+CEER ERROR:173	+ CEER ERROR: normal disconnect
58	+CEER ERROR:174	+ CEER ERROR: remote disconnect
59	+CEER ERROR:175	+ CEER ERROR: low failure
60	+CEER ERROR:176	+ CEER ERROR: network reject
61	+CEER ERROR:177	+ CEER ERROR: no cell
62	+CEER ERROR:202	+ CEER ERROR: supplement not provide

Form 1-3

1.6 SIM Insertion, SIM Removal

SIM card Insertion and Removal procedures are supported. There are software functions relying on positive reading of the hardware SIM detect pin. This pin state (open/closed) is permanently monitored. When the SIM detect pin indicates that a card is present in the SIM connector, the product tries to set up a logical SIM session. The logical SIM session will be set up or not depending on whether the detected card is a SIM Card or not.

The AT+CPIN? command delivers the following responses:

- If the SIM detect pin indicates “absent”, the response to AT+CPIN? is “+CME ERROR 10” (SIM not inserted).
- If the SIM detect pin indicates “present”, and the inserted card is a SIM card, the response to AT+CPIN? is “+CPIN: xxx” depending on SIM PIN state.
- If the SIM detect pin indicates “present”, and the inserted card is not a SIM card, the response to AT+CPIN? is “+CME ERROR 10”.
- These last two states are not provided immediately due to background initialization. Between the hardware SIM detect pin indicating “present” and the final results, the AT+CPIN? sends “+CME ERROR: 515” (Please wait, init in progress).

When the SIM detect pin indicates card absence, and if a SIM Card was previously inserted, an IMSI detach procedure is performed, all user data is removed from the product (Phonebooks, SMS etc.). The product then switches to emergency mode.

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1.7 Background initialization

After entering the PIN (Personal Identification Number), some SIM user data files are loaded into the product (phonebooks, SMS status, etc.). Please be aware that it might take some time to read a large phonebook.

The AT+CPIN? command response occurs after the PIN checking. After this response user data is loaded in background. This means that some data may not be available just when PIN entry is confirmed by 'OK'. The reading of phonebooks will then be refused by "+CME ERROR: 515" or "+CMS ERROR: 515" meaning, "Please wait, service is not available yet, init in progress".

This type of answer may be sent by the product at several points:

- when trying to execute another AT command before the previous one is completed (before

response),

- when asking for +CPIN? status immediately after SIM insertion and before the product has determined if the inserted card is a valid SIM card.

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Chapter 2. General Commands

2.1 AT

Description	Check the if connection with DCE module.
Command	AT
Response	OK

2.2 ATZ

Description	Reset default configuration
Command	ATZ
Response	OK

2.3 ATE

Description	This command is used to set command echo mode.
Command	ATE<value>
Response	OK
Reference	value: 0:DCE Echo mode off 1:DCE Echo mode on

2.4 ATS0

Description	Set number of rings before automatically answering the call.
Command	ATE<value>
Response	OK
Command	ATS0?
Response	<value>
Command	ATS0=?
Response	S0:(0-255) OK

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Note: The module does not support this function at present.

2.5 ATQ

Description	Set result code presentation mode.
Command	ATQ<mode>
Response	OK or no response
Reference	mode: 0:DCE transmits result code. 1:Result codes are suppressed and not transmitted.

2.6 ATV

Description	DCE response format.
Command	ATV<value>
Response	1 OK Or 0 0
Command	ATV=?
Response	V:(0,1) OK

2.7 AT&W

Description	This commands writes the active configuration to a non-volatile memory (EEPROM).
Command	AT&W
Response	OK

stored by &W

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NO.	Content	AT commands
1	CLIP	AT+CLIP
2	COLP	AT+COLP
3	SMS mode	AT+CMGF
4	Mixed mode	AT+SMUX
5	Indicator of charging status.	AT+SBCM
6	CREG mode	AT+CREG
7	SIDE TONE	AT+SIDET
8	Report Mobile Equipment errors	AT+CMEE

2.8 AT+CMEE

Description	Report Mobile Equipment errors.
Command	AT+CMEE=<value>
Response	OK or 0
Command	AT+CMEE?
Response	1+CMEE: <value> OK
Command	AT+CMEE=?
Response	+CMEE:(0-2) OK
Reference	value: 0:Disable +CME ERROR: <err>result code and use ERROR instead. 1:Enable +CME ERROR: <err> result code and use numeric<err> 2:Enable +CME ERROR: <err> result code and use verbose <err> values

2.9 AT+CFUN

Description	Set phone functionality.
Command	AT+CFUN=<value1>,[<value2>]
Response	OK
Command	AT+CFUN=?
Response	+CFUN:(0-1),(0-1)

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	OK
Reference	value1: 0:minimum functionality 1:full functionality
	value2: 0:Do not restart module 1:restart module

2.10 AT+CCLK

Description	Clock
Command	AT+CCLK=<date and time string>
Response	OK/+CME ERROR<err>
Command	AT+CCLK?
Response	+CCLK:<current date and time>OK
Reference	<date and time string>:"yy/mm/dd,hh:mm:ss", user should input figures according to the format.

Example:

AT+CCLK="03/05/23,09:45:10"

OK

2.11 AT+IPR

Description	This command specifies the data rate at which the DCE will accept commands.
Command	AT+IPR=<baudrate>
Response	OK/ERROR
Command	AT+IPR?
Response	+IPR:<current baudrate>OK
Command	AT+IPR=?
Response	+IPR:{1200,2400,4800,9600,19200,38400,57600,115200,230400,460800} OK
Reference	baudrate:{1200,2400,4800,9600,19200,38400,57600,115200,2

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	30400, 460800} Default value is 115200

2.12 AT+CGSN

Description	This command allows the user application to get the IMEI (International Mobile Equipment Identity, 15 digits number) of the product.)
Command	AT+CGSN
Response	<sn>OK
Command	AT+CGSN=?
Response	+CGSN:OK

Example:

AT+CGSN

33219070097265020

OK

2.13 AT+CGMM

Description	This command is used to get the supported frequency bands. With multi-band products the response may be a combination of different bands.
Command	AT+CGMM
Response	<module identification>
Command	AT+CGMM=?
Response	+CGMM:OK

Example:

AT+CGMM

V1.0.1-B7

OK

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2.14 AT+CGMR

Description	This command is used to get the revised software version.
Command	AT+CGMR
Response	<version number>OK
Command	AT+CGMR=?
Response	+CGMR:OK

2.15 AT+CGMI

Description	This command gives the manufacturer identification.
Command	AT+CGMI
Response	<manufacturer>OK
Command	AT+CGMI=?
Response	+CGMI:OK

Example:

AT+CGMI

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OK

2.16 AT+CPAS

Description	This command returns the activity status of the mobile equipment.
Command	AT+CPAS
Response	+CPAS:<code>OK
Command	AT+CPAS=?
Response	+CPAS:<list supported value>OK
Reference	code： 0：Ready(allow commands from TA/TE) 3：ringing(ringer is active) 4：call in progress

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2.17 AT+CCID

Description	This command orders the product to read the EF-CCID file on the SIM card.
Command	AT+CCID?
Response	+CCID:"sim number"OK
Command	AT+CCID
Response	+CCID:"sim number"OK
Command	AT+CCID=?
Response	+CCID:OK

Example:

AT+CCID?

+CCID: "89860081090209606758"

OK

2.18 AT+CIMI

Description	This command is used to read and identify the IMSI (International Mobile Subscriber Identity) of the SIM card. The PIN may need to be entered before reading the IMSI
Command	AT+CIMI
Response	+CIMI:<imsi string>OK
Command	AT+CIMI=?
Response	+CIMI:OK

Example:

AT+CIMI

+CIMI: "460006963106758"

OK

2.19 AT+CBC

Description	Request module battery state.
Command	AT+CBC

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Response	+CBC:<bcs>,<bcl>OK
Command	AT+CBC=?
Response	+CBC:(0-2),(0-100)OK
Reference	bcs: 0:Powered by battery(no charger) 1:ME connect battery,but charger supplys power. 2:ME no battery(not support)
	bcl: 0: battery level 0 (0%) 1-99:battery level (1-99%) 100:battery level 2 (100%)

2.20 AT+CPOF

Description	This specific command allows to power off FLY280 module
Command	AT+CPOF
Response	OK
Command	AT+CPOF=?
Response	+CPOF:OK

2.21 AT+CSCS

Description	This command informs the ME which character set is used by the TE. The ME can convert each character of entered or displayed strings. This is used to send, read or write short messages.
Command	AT+CSCS=<chset>
Response	OK
Command	AT+CSCS?
Response	+CSCS:<chset>OK
Command	AT+CSCS=?
Response	+CSCS:("GSM","IRA") OK
Reference	chset:

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	"GSM":GSM default character"IRA":International Reference character(ITU-T T.50)

2.22 AT+SAC

Description	This command can stop the network search service and additional services
Command	AT+SAC
Response	OK
Command	AT+SAC?
Response	OK/ERROR(When the ME is searching network or there is additional service, the response will be ERROR,
Command	AT+SAC=?
Response	OK

2.23 AT+STONE

Description	This command is used to play voice at a certain frequency, frequency volume and duration is adjustable.
Command	AT+STONE=<mode>,[<freq>,<duration>]
Response	OK/ERROR
Command	AT+STONE?
Response	OK/ERROR
Command	AT+STONE=?
Response	+STONE:(0,1),(0-3400),(0-50)OK
Reference	mode: 0:stop play 1:start play
	freq:speaker:1~3400hz Buzzer:1~3400hz
	duration: 0~50.unit:100ms. 0 is default value,you can input "AT+STONE=0" to stop

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2.24 AT+SDTMF

Description	Sent key board tone
Command	AT+SDTMF=<mode>[,<dtmf>,<duration>]
Response	OK +CME ERROR:<err>
Command	AT+SDTMF=?
Response	+SDTMF(0-1),(0-9,*,#,A,B,C,D),(0-50)OK
Reference	mode: 0:stop sent key board tone 1:sent key board tone
	demf:{0-9,*,#,A,B,C,D}Character Set
	duration:0~50. Default value is 0, you can input "AT+STONE=0 to stop it.

2.25 AT+SCDM

Description	Alert sound mode
Command	AT+SCDM=<melody>
Response	OK
Command	AT+SCDM?
Response	+SCDM:<melody>OK
Command	AT+SCDM=?
Response	+SCDM:(0-47)OK
Reference	melody:sound mode 0:no sound, default value 1…15:build-in tone 16…47:download tone(If there is no download tone, the response will be Error)

2.26 AT+SBCM

Description	This command is used to manage battery charging and set its

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	charging parameter.
Command	AT+SBCM=<Mode>[,[<ChargeInd>][,[<BattLevelMax>], [<BattLevelMin>],<TPulseInCharge>],[<TPulseOutCharge>], [<BattIntRes>]]]
Response	OK/ERROR
Command	AT+SBCM=?
Response	+SBCM:(0-3),(0-1),(4000-5000),(2800-3800),(100-10000),(100-10000), (0-255)OK
Reference	mode: 0:stop charging 1:start to charge 2:inquire the current battery voltage 3:set battery charging parameter.
	ChargeInd: 0:cancel +SBCM code 1:enable+SBCM code
	BattLevelMax:battery voltage is maximum, and battery will stop charging. Values range:4000~5000;Default:4200mv
	BattLevelMin:battery voltage reaches its minimum level, and DCE will shutdown. Values range:2800~3800;Default:3300mv
	TPulseInCharge:charging pulse interval. Values range:100~10000; Default:100ms
	TPulseOutCharge:sent +SBCM interval. Values range:100~10000;Default:5000ms
	BattIntRes:battery internal resistance. Value range: 0~255mΩ; Default:0 mΩ

2.27 +SBCI

Description	Battery status and current voltage query.
Command	+SBCI:<status>[,<level>]

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Response	
Reference	status: 0:Battery reaches its minimum level. 1:Battery reaches its maximum level. 2:Battery is charging up. 3:Battery is not
	level:Battery current voltage.

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Chapter 3. Network Service Commands

3.1 AT+COPS

Description	AT+COPS is used to force registration/deregistration.
Command	AT+COPS=<mode>,[<format>[,<oper>]]
Response	OK +CME ERROR:<err>
Command	AT+COPS?
Response	+COPS:<mode>[,<format>,<current oper>]
Command	AT+COPS=?
Response	+COPS:[mobile communication network list(<stat>,long alphanumeric<oper>,short phanumeric<oper>s,numeric<oper>)s]
Reference	mode: 0:auto select(oper is ignore) 1:manual select(oper should be present) 2:cancel registered network 3:only for format setting. 4:auto/manual
	format: 2:figure<oper>
	start: 0:unknown 1:available 2:enabled 3:forbidden
	oper:operation code

Example:

AT+COPS=?

+COPS: (1,"","",46000),(3,"","",46001)

OK

AT+COPS?

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+COPS: 1,2,46000

auto select network:

AT+COPS=0

OK

manual select network:

AT+COPS=1,2,46000

OK

3.2 AT+CSQ

Description	This command is used to ascertain the received signal strength indication (<rssi>) and the channel bit error rate (<ber>) with or without a SIM card inserted.
Command	AT+CSQ
Response	+CSQ:<rssi>,<ber>OK
Command	AT+CSQ=?
Response	+CSQ:(0-31),(0-7,99)OK
Reference	rssi: 0:-110db 1-30:…… 31:-48db
	ber: 0~7:RXQUAL value(GSM) 99:Invalid value

Example:

AT+CSQ

+CSQ:23,99

OK

3.3 AT+CCED

Description	This command can be used by the application to retrieve the parameters of the main cell and of up to six neighbouring cells.
Command	AT+CCED=<mode>[,<requested dump>]

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Response	Possible response: +CCED:<mcc>,<mnc>,<Lac>,<Cell id>,<Bsic>,<Arfcn>,<Rxlev>,<Rxqual> If there is no network in main cell Response:+CCED: read Timing Advance Response:+CCED:<Timing Advance> Read RSSI of main cell:Response:+CSQ:<rssi>,<Rxqual>
Command	AT+CCED=?
Response	+CCED:(0-2),(1,2,4,8)OK
Reference	mode: 0:One shot requested 1:Automatic shots requested 2:Stop automatic shots
	requested dump: 1:Main Cell 2:Neighbour 4:Timing Advance 8:RSSI value of main cell

Response description:

Parameter	Description
mcc	Mobile Country Code
mnc	Mobile Network Code
Lac	Location Area Code
Cell id	Cell id
Bsic	Base Station Identity Code
Arfcn	BCCH channel code
Rxlev	Received signal strength(0-63)
Rxqual	Received signal quality(0-7),iInvalid value is 99

Example:

AT+CCED=0,1

+CCED: 460,0,6248,5377,49,30,30,99

OK

AT+CCED=0,2

+CCED:

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460,00,6269,33026,50,14,16,460,00,6269,12434,54,26,11,460,00,6250,24625,51,20,11

OK

AT+CCED=0,4

+CCED: 0

OK

AT+CCED=0,8

+CCED: 30, 99

OK

3.4 AT+CREG

Description	This command is used by the application to ascertain the registration status of the product.
Command	AT+CREG=<mode>
Response	OK/ERROR
Command	AT+CREG?
Response	+CREG:<mode>,<state>OK
Command	AT+CREG=?
Response	+CREG:(0,1,2)OK
Reference	mode:Default value 0 0:Disable network registration unsolicited result code (default) 1:Enable network registration code result code +CREG : <stat> 2:Enable network registration and location information unsolicited result code +CREG: <stat>,<lac>,<ci> if there is a change of network cell.

Response description:

Parameter	Description
state	0:not registered, ME is not currently searching for a new operator. 1:registered, home network. 2:not registered, ME currently searching for a new operator to register to.

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	3:registration denied. 4:unknown. 5:registered, roaming.
lac	string type; two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal).
ci	string type; two byte cell ID in hexadecimal format.

Example:

AT+CREG=1

OK

+CREG: 1

AT+CREG=2

OK

+CREG: 1,1868,1501

AT+CREG=0

OK

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Chapter 4. Call Control Commands

4.1 ATD

Description	This command can be used to set up outgoing voice, date or fax calls. It also serves to control supplementary services.
Command	ATD<dialing string>
Response	OK,call succeeded. NO CARRIER,call failed or remote user released. ERROR
Reference	dialing string:{0-9,*,#,+,a,b,c}

Note: Make calls through phone book is not supported at present.

Example:

atd10086;

+SIND: 5,1

+SIND: 2

+SIND: 9

OK

4.2 ATA

Description	Answer an RING(Incoming call)
Command	ATA
Response	OK

4.3 ATH

Description	The ATH command is used by the application to disconnect the remote user. In the case of multiple calls, all calls are released (active, on-hold and waiting calls).
Command	ATH
Response	OK

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4.4 AT+VTD

Description	The product enables the user application to send DTMF tones over the GSM network. This command is used to define tone duration.
Command	AT+VTD=<n>
Response	OK
Command	AT+VTD?
Response	+VTD:<n>OK
Command	AT+VTD=?
Response	+VTD:(0-255)OK
Reference	n:(0-255)n*100ms

4.5 AT+VTS

Description	The product enables the user application to send DTMF tones over the GSM network. This command enables tones to be transmitted, only when there is an active call.
Command	AT+VTS=<Tone>[,<start>]
Response	OK +CME ERROR:<err>
Command	AT+VTS=?
Response	+VTS:(0-9,*,#,A,B,C,D)OK
Reference	Tone:{0-9,*,#,A,B,C,D}
	start: 0:Stop DTMF 1:Start DTMF

Example:

AT+VTS=2;

+VTS=1;

+VTS=8

OK

AT+VTS=6,1

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OK

AT+VTS=6,0

OK

4.6 AT+VGR

Description	This command is used by the application to tune the receive gain of the speaker and the transmit gain of the microphone.
Command	AT+VGR=<value>
Response	OK
Command	AT+VGR?
Response	+VGR:<current value>
Command	AT+VGR=?
Response	+VGR:(1-9)
Reference	value:volume of receiver, Values range:1~9

4.7 AT+CMUT

Description	This command is used to mute the microphone input on the product
Command	AT+CMUT=<mode>
Response	OK/ERROR
Command	AT+CMUT?
Response	+CMUT:<mode>OK
Command	AT+CMUT=?
Response	+CMUT:<supported value>OK
Reference	mode: 0:microphone mute off. 1:microphone mute on.

4.8 AT+ECHO

Description	This specific command is used to enable, disable or configure the Echo Cancellation functions for voice calls (in rooms, in cars,

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	etc.)
Command	AT+ECHO=<mode>,<Algold>,<param1>,<param2>,<param3>,<param4>,<param5>,<param6>
Response	OK/ERROR
Command	AT+ECHO?
Response	+ECHO:<status>,<Algold>,<param1>,<param2>,<param3>,<param4>,<param5>,<param6>
Reference	mode: 0:disable ECHO 1:enable ECHO
	Algold: 0:disable DTMF 1:enable DTMF

4.9 AT+CICB

Description	Date, fax and speech incoming mode
Command	AT+CICB=<value>
Response	OK
Command	AT+CICB?
Response	+CICB:2
Command	AT+CICB=?
Response	+CICB:(0-2)
Reference	value: 0:date 1:fax 2:speech

Note: The product only supports speech at present.

4.10 AT+CRMP

Description	This command allows a melody to be played. All melodies are manufacturer defined.
Command	AT+CRMP=<call type>[,<num>,<index>]

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Response	OK	
Command	AT+CRMP=?	
Response	+CRMP:(0-3),(0-65535),(0-47)OK	
Reference	call type: 0:Incoming voice call 1:Incoming data call 2:Incoming fax call 3:Incoming SMS	
	num: 0:Cycleplay(default value) 1-65535:play for <num> times	
	index	IF <call type>=0,1,2: 0:stop playing 1-15:the tones that builded in the module 16-47:the tones that has been downloaded by user
		If <call type>=4: 0:stop playing SMS tone 1-4:SMS tone,if index>4,play SMS tone index=1

Example:

Play incoming call tone:

AT+CRMP=0,1,5

+CRMP: 5

OK

Play incoming SMS tone:

AT+CRMP=3,1,4

+CRMP: 4

OK

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Chapter 5. Auxiliary Service Commands

5.1 AT+CCFC

Description	This commands allows control of the "call forwarding" supplementary service.
Command	AT+CCFC=<reason>,<mode>,<number>,<type>,<time>
Response	OK/ERROR
Command	AT+CCFC=?
Response	+CCFC:(0-5),(0-4),,(128,129,145,161),(5-30)OK
Reference	reason: 0:Unconditional 1:Mobile busy 2:No reply 3:Not reachable 4:All call forwarding 5:All conditional call forwarding
	mode: 0:Disable 1:Enable 2:Interrogate 3:Registration 4:Erasure
	number:The number that to be transferred.
	type: 128:unknown number type 129:ISDN number type(default) 145:International ISDN phone number 161:Domestic ISDN phone number.
	time:available if <reason> is no-reply,(5-30)second

Example:

AT+CCFC=3,3,"01050802727",128

OK

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AT+CCFC=3,1,"01050802727",128

OK

AT+CCFC=3,2

+CCFC: 1,0,"+862150802727",145

OK

5.2 AT+CCWA

Description	This command allows control of the call waiting supplementary service.
Command	AT+CCWA=<n>[,<mode>[,<class>]]
Response	OK or +CCWA:<status>,<class> OK
Command	AT+CCWA?
Response	+CCWA:<mode>
Command	AT+CCWA=?
Response	+CCWA:(0-1),(0-2),(1,2,4,128)OK
Reference	n: 0:disable 1:enable
	mode: 0:Disable 1:Enable 2:Query status
	class: 1:Voice 2:Data 4:Fax 128:All classes (voice, data and fax)

Note: Only voice service is available.

5.3 AT+CHLD

Description	This command is used to manage call hold and multiparty conversation (conference call). Calls can be put on hold,

	recovered, released or added to a conversation.
Command	AT+CHLD=<n>
Response	OK
Command	AT+CHLD=?
Response	+CHLD:(0-3,11-17,21-27)OK
Reference	n: 0:Release all held calls or set User Determined User Busy (UDUB) for a waiting call. 1:Release all active calls (if any exist) and accepts the other (held or waiting) call. 1X:Release a specific call X (active, held or waiting) 2:Place all active calls (if any exist) on hold and accepts the other (held or waiting) call. 2X:Place all active calls on hold except call X with which communication is supported. 3:Adds a held call to the conversation.

5.4 AT+CLIP

Description	This command allows control of the Calling Line Identifier presentation supplementary service.
Command	AT+CLIP=<n>
Response	OK/ERROR
Command	AT+CLIP?
Response	+CLIP:<n>,<m>/ERROR
Command	AT+CLIP=?
Response	+CLIP:(0,1)OK
Reference	n: 0:Disable +CLIP 1:enable +CLIP
	m: 0:CLIP not provisioned1:CLIP provisioned 2:Unknown (no network…)

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5.5 AT+CLIR

Description	This command allows control of the calling line identification restriction supplementary service.
Command	AT+CLIR=<n>
Response	OK/ERROR
Command	AT+CLIR?
Response	+CLIR:<n>,<m>/ERROR OK
Command	AT+CLIR=?
Response	+CLIR:(0,1)OK
Reference	n: 0:enable CLIR 1:disable CLIR
	m: 0:CLIR not provisioned 1:CLIR provisioned in permanent mode 2:Unknown (no network…) 3:CLIR temporary mode presentation restricted 4:CLIR temporary mode presentation allowed

5.6 AT+COLP

Description	This command allows control of the connected line identification presentation supplementary service.
Command	AT+COLP=<n>
Response	OK/ERROR
Command	AT+COLP?
Response	+COLP:<n>,<m>/ERROR
Command	AT+COLP=?
Response	+COLP:(0,1)OK
Reference	n: 0:Disable 1:Enable

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	m: 0:COLP not provisioned 1:COLP provisioned 2:Unknown (no network)

5.7 AT+COLR

Description	This command allows query of the status of connected line identification presentation supplementary service.
Command	AT+COLR?
Response	+COLR:0,<m>/ERROR
Command	AT+COLR=?
Response	+COLP:OK
Reference	m: 0:COLR disabled. 1:Enable COLR 2:Unknown (no network)

5.8 AT+CLCK

Please refer to section 6.3.

5.9 AT+CPWD

Please refer to section 6.2.

5.10 AT+CACM

Description	This command allows to query or reset the accumulated call meter of SIM card.
Command	AT+CACM=<PIN2>
Response	OK/ERROR
Command	AT+CACM?
Response	+CACM:<ACM>

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	OK
Command	AT+CACM=?
Response	+CACM:OK
Reference	ACM:Accumulated Call Meter

5.11 AT+CAMM

Description	This command allows to set or query the maximum of ACM.
Command	AT+CAMM=<ACMmax>,<PIN2>
Response	OK/+CME ERROR:16
Command	AT+CAMM?
Response	+CAMM:<ACMmax>OK
Command	AT+CAMM=?
Response	+CACM(0-16777215):OK

5.12 AT+CPUC

Description	This command allows to set the call rate per minute.
Command	AT+CPUC="<Currency>","<Price>",<PIN2>
Response	OK/+CME ERROR:<Err>
Command	AT+CPUC?
Response	+CPUC:"<Currency>","<Price>"OK

5.13 AT+CLCC

Description	This command is used to return a list of current calls.
Command	AT+CLCC
Response	+CLCC: +CLCC:<id1>,<dir>,<stat>,<mode>,<mpty>
Command	AT+CLCC=?
Response	+CLCC:OK

Response description:

Parameter	Description

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id1	call identification
dir	0:mobile originated (MO) call 1:mobile terminated (MT) call
stat	0:active 1:held 2:dialling (MO) 3:alerting(MO) 4:incoming(MT) 5:waiting(MT)
mode	1:voice 2:data 4:fax 9:unknown
mpty	0:call is not one of multiparty (conference) call parties 1:call is one of multiparty (conference) call parties

Example:

AT+CLCC

+CLCC: 1,0,2,32,0

5.14 AT+CUSD

Description	The USSD supplementary service is described in GSM 02.90. It is based on sequences of digits, which may be entered by a mobile user with a handset. This command is used to: Enable or disable the CUSD indication sent to the application by the product when an incoming USSD is received. Send and receive USSD strings
Command	AT+CUSD=<n>[,<str>[<dcs>]]
Response	OK/ERROR
Command	AT+CUSD=?
Response	+CUSD:(0-2),,OK
Reference	n: 0:Disable the result code presentation

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	1:Enable the result code presentation 2:Cancel session (not applicable to Command response) +CUSD:<m>[,<str>,<dcs>] Set or receive USSD format:AT+CUSD=<n>[,<str>[,<dcs>]]
	m: 0:no further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation) 1:further user action required (network initiated USSD-Request, or further information needed after mobile initiated operation) 2:USSD terminated by network. 4:Operation not supported.
	str:text
	dcs:text format(e.g:UCS2)

Note: User should enable USSD service at first, such as"AT+CUSD=1,"*188#", the network response+CUSD……, users select corresponding service and interaction on Web. Then use "AT+CUSD=2 or AT+SAC" command to disable the current USSD services.USSD services should be stopped.

5.15 AT+CSSN

Description	This command refers to supplementary service related network initiated notifications.
Command	AT+CSSN=<n>,<m>
Response	OK/ERROR
Command	AT+CSSN?
Response	+CSSN:(0-1),(0-1)OK
Command	AT+CSSN=?
Response	+CSSN:(0,1),(0,1)OK
Reference	n: 0:enable 1:disable
	m: 0:enable 1:disable

	code1: 0:unconditional call forwarding is active. 1:some of the conditional call forwarding are active. 2:call has been forwarded. 3:call is waiting. 4:this is a CUG call (also <index> present). 5:outgoing calls are barred. 6:incoming calls are barred . 7:CLIR suppression rejected.
	code2: 0:call forwarding (MT) 1:The number belong sto Closed User Groups (CUG) 2:calls are barred. 3:calls are enabled. 4:enter Multiparty Service 5:call on hold has been released 7:call is being connected (alerting) with the remote party 8:Remote multiparty service that connected.

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Chapter 6. Security Control Commands

6.1 AT+CPIN

Description	This command is used to enter the ME passwords (CHV1 / PUK1) that are required before any ME functionality can be used.
Command	AT+CPIN=<pin>OR AT+CPIN=<puk>,<newpin>
Response	OK +CME ERROR:<err>
Command	AT+CPIN?
Response	+CPIN:<code>OK
Command	AT+CPIN=?
Response	+CPIN:<CPIN>OK
Reference	pin:4-8 digits long. new pin:4-8 digits long.
	puk:8 digits long.
	code:READY:Do not need to input SIM PIN:input PIN code. SIM PUK:input PUK code.ME is waiting for SIM SIM PIN2:input PIN2 code. ME is waiting for SIM2 SIM PUK2:input PUK2 code. ME is waiting for SIM BLOCK:locked

Example:

AT+CPIN?

+CPIN:SIM PUK

AT+CPIN=12345678,2345 // alert PIN1 as"2345"

OK

AT+CPIN?

+CPIN:SIM PIN

AT+CPIN=2345

OK

AT+CPIN?

+CPIN:READY

6.2 AT+CPWD

Description	This command is used by the application to change a password.

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Command	AT+CPWD=<fac>,<oldpwd>,<newpwd>
Response	OK +CME ERROR:16
Command	AT+CPWD=?
Response	+CPWD:("PS",8),("SC",8),("AO",4),("OI",4),("OX",4),("AI",4),("IR",4),("AB",4), ("AG",4),("AC",4),("P2",8),("FD",8),("PN",8),("PU",8),("PP",8),("PC" ,8)OK
Reference	fac: "PS":SIM card lock,password is 8 digits long"SC": SIM correspond to PIN1 code."AO":BAOC(barr all outgoing calls)"OI":barr outgoing international calls"OX":barr outgoing international calls except to home country"AI":barr all incoming calls"IR":barr incoming calls when roaming outside the home country"AB":all barring services"AG":all out going barring services"AC":all in coming barring services"PN":network lock,password is 8 digits long"PU":network sub-lock,password is 8 digits long."PP":service supplier lock. Password is 8 digits long."PC":public lock,password is 8 digits long."FD":SIM card FDN Fixed Dialling lock ,PIN2 is password "P2":PIN2 lock

Example:

AT+CPWD="AI",1234,1111

OK

6.3 AT+CLCK

Description	This command is used by the application to lock, unlock or interrogate an ME or network facility
Command	AT+CLCK=<fac>,<mode>[,<password>[,<class>]]
Response	OK +CME ERROR:<err> +CLCK:<status>[,<class>]
Command	AT+CLCK?

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Response	+CLCK(list all supported<fac>s,list corresponding<status>s)
Command	AT+CLCK=?
Response	+CLCK(list all supported<fac>s)
Reference	fac: "PS":SIM lock facility with a 8 digits password. "SC": SIM correspond to PIN1 code."AO":BAOC(barr all outgoing calls)"OI":barr outgoing international calls"OX":barr outgoing international calls except to home country"AI":barr all incoming calls"IR":barr incoming calls when roaming outside the home country"AB":all barring services"AG":all out going barring services"AC":all in coming barring services"PN":network lock,password is 8 digits long"PU": network sub-lock,password is 8 digits long."PP":service supplier lock. Password is 8 digits long."PC":public lock,password is 8 digits long."FD":SIM card FDN Fixed Dialling lock ,PIN2 is password "P2":PIN2 lock
	mode: 0:unlock 1:lock 2:query status
	class: 1:Voice (telephony) 2:Data (apply to all bearer services) 4:fax 8:SMS 7:Equal to all classes (Default value)
	status: 0:Disable 1:Enable
	password:(0~9) character,Password maximum length is given with the AT+CPWD=? Command.

Note: Class can only support speech service. "PS","PN","PU","PP","PC" and "FD" is unavailable

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at present

Example:.

AT+CLCK="AI",1,1234

OK

AT+CLCK="AI",2

+CLCK: 1,0

6.4 AT+XX

Description	This command allows to check the remaining times to input PIN or PUK.
Command	AT+XX=<value>
Response	+XX:<remaining_num>OK
Reference	value: 0:PIN 1 1:PIN 2 2:PUK 1 3:PUK 2

Example:

AT+XX=0

+XX:3

OK

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Chapter 7. Short Messages Commands

7.1 AT+CSMS

Description	The supported services are originated (SMS-MO) and terminated short message (SMS-MT) + Cell Broadcast Message (SMS-CB) services.
Command	AT+CSMS=<service>
Response	+CSMS=<mo>,<mt>,<cb>OK
Command	AT+CSMS?
Response	+CSMS:<service>,<mo>,<mt>,<cb>OK
Command	AT+CSMS=?
Response	+CSMS:<service>OK
Reference	service: 0:SMSAT command is compatible with GSM07.05 PHASE 2. 1:SMSAT command is compatible with GSM07.05 PHASE 2+.
	mo: 0:mo SMS is not supported. 1:mo SMS is supported.
	mt: 0:mt SMS is not supported. 1:mt SMS is supported.
	cb: 0:cb is not supported. 1:cb is supported.

Note: GSM07.05 PHASE and GSM0.05 PHASE2+ is case insensitive.

7.2 AT+CSAS

Description	All settings specified by the +CSCA and +CSMP commands are stored in EEPROM if the SIM card is a Phase 1 card or in the SIM card if it is a Phase 2 SIM card.
Command	AT+CSAS
Response	OK

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7.3 AT+CRES

Description	All settings specified in the +CSCA command is restored from EEPROM if the SIM card is Phase 1 or from the SIM card if it is a Phase 2 one.
Command	AT+CRES
Response	OK

7.4 AT+CSDH

Description	This command allows to show SMS Text Mode parameters.
Command	AT+CSDH=<value>
Response	OK
Command	AT+CSDH?
Response	+CSDH:<value>OK
Command	AT+CSDH=?
Response	+CSDH:0 OK
Reference	value: 0:do not show the detailed header information. 1:show the detailed header information.

Note: The system does not support to show detailed header information at present.

7.5 AT+CPMS

Description	This command allows the message storage area to be selected (for reading, writing, etc).
Command	AT+CPMS=<mem1>,<mem2>
Response	+CPMS:<used1>,<total1>,<used2>,<total2>OK/ERROR
Command	AT+CPMS?
Response	+CPMS:<mem1>,<used1>,<total1>,<mem2>,<used2>,<total2> OK
Command	AT+CPMS=?
Response	+CPMS:(("BM","SM","SR"),("BM","SM","SR")) OK

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Reference	mem1:the message storage area.(for reading, delete, etc)."SM","BM","SR"
	mem2:the message storage area.(for writing, sending, etc)."SM"
	usedx:<memx>The number of area that has been used.
	totalx:<memx>Total quantity of messages can be storaged.
	"SM":SIM storage area.
	"BM":Message storage area. In ME.
	"SR":Message status report storage area in ME.

Note: FLY280 only support "SM""BM"storage.

Example:

AT+CPMS="BM","SM"

+CPMS: 0,0,12,20

OK

7.6 AT+CSCA

Description	This command allows to set or read the number of Message Centre.
Command	AT+CSCA=<sca>
Response	OK
Command	AT+CSCA?
Response	+CSCA:<sca>OK
Command	AT+CSCA=?
Response	+CSCA:OK
Reference	sca:Message Centre Number,{0-9,*,#,+,a,b,c},maximum length is 20.

Example:

AT+CSCA?

+CSCA: "+8613800230500"

OK

AT+CSCA="8613800230500"

OK

AT+CSCA=?

+CSCA:

OK

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7.7 AT+CMGF

Description	Set Preferred Message Format.
Command	AT+CMGF=<mode>
Response	OK/ERROR
Command	AT+CMGF?
Response	+CMGF=<mode>OK
Command	AT+CMGF=?
Response	+CMGF:(0,1)OK
Reference	mode: 0:PDU mode(default value) 1:Text mode

Example:

AT+CMGF?

+CMGF: 0

OK

AT+CMGF=1

OK

7.8 AT+CMGL

Description	This command allows the application to read stored messages, by indicating the type of the message to read.
Command	AT+CMGL=<state>
Response	Text mode response: +CMGL:<index>,<dcs>,<stat>,<da/oa>,<valid period><CR><LF>(for SMS-SUBMIT) +CMGL:<index>,<dcs>,<stat>,<da/oa>,<time stamp><CR><LF>(for SMS-DELIVER) +CMGL:<index>,<stat>,<st>(for SMS-ATATUS-REPORT)

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	PDU mode response: +CMGL:<index>,<stat>,<length>,<CR><LF> <PDU>(for SMS-DELIVER,SMS-SUBMIT and SMS-ATATUS-REPORT)

Responses &stat description:

stat(Text Mode)	stat(PDU Mode)	description
"REC UNREAD"	0	received unread messages
"REC READ"	1	received read message
"STO UNSENT"	2	stored unsent messages
"STO SENT"	3	stored sent messages
"ALL"	4	all messages

Example:

Select PDU mode:

AT+CMGF=0

OK

Show all messages:

AT+CMGL=4

+CMGL: 1, 2, ,21

0891683108200305F0114A0481111100008F0CD3E594B85C1297C4257109

+CMGL: 2, 2, ,24

0891683108200305F0314A0B803118665868F50008AD0A00680065006C006C0

06F

+CMGL: 3, 1, ,13

018000008000000000000000000000

OK

Select TEXT mode:

AT+CMGF=1

OK

Show all messages:

AT+CMGL="ALL"

+CMGL: 1,"REC READ","",,"00/00/00,00:00:00+00"

+CMGL: 2,"REC READ","",,"00/00/00,00:00:00+00"

+CMGL: 3,"STO UNSENT","1111",,43200

SKSDKKDKDKDK

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+CMGL: 4,"STO UNSENT","13816685865",,604800,0680065006C006C006F

+CMGL: 5,"REC READ","12581",,"04/05/13,11:43:06+00"

975E5E3853EF4E50003A7532003A4E456CA180547EDC7684540C5B664E0076

F45411621163A89500

4E005957767E79D151684E66FF0C70E6FF0162115C3176F463A57ED94ED68B

F4201C5C1167658FD9

4E005957201D4E59003A4ED667094EC04E4853CD5E94FF1F7532003A7ED36

79C4ED653C84ECB7ECD621153E64E0059573002

OK

7.9 AT+CMGR

Description	This command allows the application to read stored messages, by indicating the type of the message to read. The messages are read from the memory selected by the +CPMS command.
Command	AT+CMGR=<index>
Response	Text mode response: +CMGR:<stat>,<dcs>,<oa>,<ts><CR><LF><data>(for SMS-DELIVER only) +CMGR:<stat>,<dcs>,<da>,<ts><CR><LF><data>(for SMS-SUBMIT only) +CMGR:<stat>,<st>(for SMS-STATUS-REPORT only)
	PDU mode response: +CMGR:<stat>,<length>,<CR><LF> <PDU>

Note:The message status report will be regarded as regular MT short message by FLY280.

Example:

AT+CMGR=12

+CMGR: "REC READ","12581",,"04/05/17,11:33:39+00"

975E5E3853EF4E50003A9662957F53EE5631533B751F003A4F607ED967D05B

98592A592A62A5544A

68C067E57ED3679C65F6FF0C75288BCD8981658796C53002533B751F70B959

34FF0C68C067E55B8

540EFF0C533B751F8BF4003A606D559C592B4EBAFF0C60A8818080F191CC6

7094E00989700340030

514B62C976846F024EAE77F35934

OK

7.10 AT+CMGS

Description	The <address> field is the address of the terminal to which the message is sent.
Command	In text(AT+CMGF=1) mode: Set command:AT+CMGS=<da>[,<moresms>]<CR> >TEXT <ctrl+Z/ESC> In PDU(AT+CMGF=0) mode: set command:AT+CMGS=<length><CR> >PDU <ctrl-z/ESC>
Response	+CMGS:<mr>OK
Command	AT+CMGS=?
Response	+CMGS:(0,1)OK
Reference	length:TPDU length,range 9-160
	PDU:In the case of SMS:GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number. In the case of CBS: GSM 03.41 TPDU in hexadecimal format.
	TPDU in hexadecimal format should be converted to two ASCII character. Length range is 18-502.
	da:target address,maximum length is 40.
	moresms:Choose if need to sent short messages in succession.
	Text:Input content.(0…9,A…F). If dcs is a7Bit ASCII character,the length range will be 0-160;If dcs is a 8Bit ASCII character,otherwise length range will be 0-140; If dcs is a UCS2 character,otherwise length range will be 0-140.

7.11 AT+CSMP

Description	This command is used to select a value for <vp>, <pid>, and <dcs>
Command	AT+CSMP=<fo>,<vp>,<pid>,<dcs>
Response	OK/ERROR
Command	AT+CSMP?
Response	+CSMP:<fo>,<vp>,<pid>,<dcs>
Command	AT+CSMP=?
Response	+CSMP:(0-255),(0-255),(0-9,11,12,127),(0-2)OK
Reference	fo:First Octet,Default value is 19.
	vp:Validity Period,default value is 143 0~143:(VP+1)×5min(max 12hour) 144~167:12hour+((VP.143)×30min) 168~196:(VP.166)×1day 197~255:(VP.192)×1week
	pid: is used to indicate the higher layer protocol being used or indicates interworking with a certain type of telematic device. Default value is 0. 0:implicit-device type is specific to this SC,or can be concluded on thebasis of the address 1:telex(or teletex reduced to telex format) 2:group 3 telefax 3:group 4 telefax 4:voice telephone(i.e.conversion to speech) 5:ERMES(European Radio Messaging System) 6:National Paging system(known to the SC) 7:Videotex(T.100/T.101) 8:teletex,carrier unspecified 9:teletex,in PSPDN 11:teletex,in analog PSTN 12:teletex,in digital ISDN 7F:SIM DOWNLOAD

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	dcs: is used to determine the way the information is encoded. Default value is 0. 0:default alphabet 1:8 bit data 2:UCS2

Example:

AT+CSMP=19,143,0,0

OK

AT+CSMP?

+CSMP: 19,143,0,0

OK

7.12 AT+CMGW

Description	This command stores a message in memory (either SMS-SUBMIT or SMSDELIVERS).
Command	In PDU mode: AT+CMGW=<length>[,<stat>]<CR> >PDU is given<ctrl-Z/ESC> In TEXT mode: AT+CMGW="<da>",[<stat>]<CR> >TEXT is given<ctrl-Z/ESC>
Response	+CMGW:<index>OK
Reference	length:TPDU length(byte),range is 9~160
	da:target address, maximum length is 40.
	stat:status of messages in memory 0:received unread messages (MT) 1:received read messages (MT) 2:unsent messages(MO) 3:sent messages(MO)
	index:index in <mem2>
	PDU:the same as AT+CMGS
	Text:the same as AT+CMGS

Example:

AT+CMGF=1

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OK

AT+CMGW="13918928088"

>TEST <ctrl-Z>

+CMGW: 16

OK

7.13 AT+CMSS

Description	This command sends a message stored at location value <index>.
Command	AT+CMSS=<index>[,"<da>"]
Response	+CMSS:<mr>OK
Command	AT+CMSS=?
Response	+CMSS:(1-255),,OK
Reference	index:Index in SIM card.
	da:target number, maximum length is 40.

Example:

AT+CMGF=1

OK

AT+CMGW="13918928088"

>TEST <ctrl-Z>

+CMGW: 16

OK

AT+CMSS=16

OK

7.14 AT+CMGD

Description	This command is used to delete one or several messages from preferred message storage.
Command	AT+CMGD=<index>[,<DelFlag>]
Response	OK/ERROR
Command	AT+CMGD=?
Response	+CMGD:(1-255),(0-4)OK
Reference	index:index in <mem1>,range is the maximum value in<mem1>.

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	DelFlag: 0:Delete message at location <index>. 1:Delete All READ messages 2:Delete All READ and SENT messages 3:Delete All READ, SENT and UNSENT messages 4:Delete All messages.

7.15 AT+CSCB

Description	This command selects which types of CBMs are to be received by the ME. It is allowed in both PDU and text modes.
Command	AT+CSCB=<mode>,<mid>,<dcs>
Response	OK
Command	AT+CSCB?
Response	+CSCB=<mode>,<mids>,<dcss>
Command	AT+CSCB=?
Response	+CSCB:(0,1),(0-65535),(0-255)OK
Reference	mode: 0:message types specified in <mids> and <dcss> are accepted. 1:message types specified in <mids> and <dcss> are not accepted.
	mid:value 0~65535
	dcs:value 0~255

Note: At present FLY280 does not support Cell Broadcast.

7.16 AT+CNMI

Description	This command selects the procedure for message reception from the network.
Command	AT+CNMI=<mode>,<mt>,<cbm>,<ds>
Response	OK/ERROR
Command	AT+CNMI?
Response	+CNMI:3,0,0,0,0 OK
Command	AT+CNMI=?

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Response	+CNMI:(0-3),(0-3),(0-1),(0-1)OK
Reference	mode:Prompt mode,default value is 3,system only support 3 at present. 3:Return result code to DTE
	mt:sets the result code indication routing for SMS-DELIVER indications. Default value is 0. 0:No SMS-DELIBER 1:Auto prompt:+CMTI:<mem>,<index> 3:Prompt directly:+CMT:result code
	cbm:Set Cell broadcast prompt, default value is 0. 0:No CBM indications are routed to the DTE. 1:Sent CBMS to DTE
	ds: for SMS-STATUS-REPORTs. Default is 0. 0:No SMS-STATUS-REPORTs are routed. 1:SMS-STATUS-REPORTs are routed using unsolicited code :

Example:

AT+CNMI=3,0,1,1

OK

AT+CNMI?

+CNMI: 3,0,1,1

OK

7.17 +CMTI

Description	Show the index number of received messages in MEM.
Format	+CMTI:<mem>,<index>
Reference	mem: "SM":SM message storage "ME":ME message storage
	index:Index number in <mem>

7.18 +CMT

Description	Sent the received message to DTE directly.

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Format	In PDU mode(AT+CMGF=0): +CMT:<length>,<CR><pdu> In TEXT mode(AT+CMGF=1): +CMT:<od>,<sc>,<time stamp>,<length>,<CR><text>

7.19 +CBM

Description	Sent Cell Broadcast Message to DTE.
Format	+CBM:<mid>,<dcs><cr><lf>
Reference	mid:Information ID
	dcs:Data coding format
	text:Definite data based on <dcs>

7.20 AT+SMSC

Description	This command is used to change the status of messages stored in SIM card.
Command	AT+SMSC=<loc>,<status>
Response	OK +CMS ERROR:321 (<loc>incorrect) +CMS ERROR:302 (<status>mismatch)
Command	AT+SMSC=?
Response	+SMSC:(1-65535),OK
Reference	loc:serial number of messages in SIM card.

Form 7-1 status Reference

PDU Mode	TEXT Mode
0	REC UNREAD
1	REC READ
2	STO UNSENT
3	STO SENT

7.21 AT+SUSS

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Description	This command is used to assure that when use AT+CMGR and AT+CMGL command, the message REC will not be changed.
Command	AT+SUSS=<mode>
Response	OK
Command	AT+SUSS?
Response	+SUSS:<mode>OK
Command	AT+SUSS=?
Response	+SUSS:(0-1)
Reference	mode: 0:Message status will not be changed. 1:Message status will be changed.(Default value)

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Chapter 8. Phonebook Commands

8.1 AT+CPBS

Description	This command selects phonebook memory storage.
Command	AT+CPBS=<storage>
Response	OK/ERROR
Command	AT+CPBS?
Response	+CPBS:<storage>(Default value"SM"),<num used>,<num available>
Command	AT+CPBS=?
Response	+CPBS:("SM","FD","LD","MC","RC","ME")
Reference	num used:phone book that has been used.
	num available:phone book available.
	storage: "SM":SIM phonebook"FD":Fixed Dialling phonebook "LD":Lately Dialling phonebook"MC":Missed calls phonebook"RC":Received call phonbook"ME":Mobile equipment phonebook

8.2 AT+CPBR

Description	This command returns phonebook entries for a range of locations from the current phonebook memory storage selected with +CPBS.
Command	AT+CPBR=<index1>[,<index2>]
Response	+CPBR=<index1>,<number>,<type>,<text>,<CR>,<CF> …… <index2>,<number>,<type>,<text>,<CR>,<CF>
Command	AT+CPBR=?
Response	+CPBR:<list supported<index>s>,<nlength>,<tlength>OK
Reference	nlength:maximum length of phone number.
	tlength:maximum length of name.

Example:

AT+CPBR=1

+CPBR:1,"13918928056",129,"Steven"

OK

AT+CPBR=1,2

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+CPBR:1,"13918928056",129,"Steven"

+CPBR:2,"13980563798",129,"Mary"

OK

8.3 AT+CPBF

Description	This command returns phonebook entries with alphanumeric fields starting with a given string.
Command	AT+CPBF=<name>
Response	+CPBF:<index>,<number>,<type>,<name> or ERROR(not found)
Command	AT+CPBF=?
Response	+CPBF:<nlength>,<tlength>
Reference	nlength:maximum length of phone number.
	tlength:maximum length of name.

Example:

AT+CPBF="Mary"

+CPBF:2,"13980563798",129,"Mary"

OK

8.4 AT+CPBW

Description	This command writes a phonebook entry in location number <index> in the current phonebook memory storage.
Command	AT+CPBW=<index>[,"<number>"[,<type>[,"<name>"]]]
Response	OK
Command	AT+CPBW=?
Response	+CPBW(list supported<index>s),<nlength>,<list supported types>,<tlength>
Reference	index: integer type value depending on the capacity of the phonebook memory.
	number:phone number
	type:Type of address byte in integer format
	name:name,the maximum length could not be more than<tlength>

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	nlength:maximum length of phone number.
	tlength:maximum length of name.

8.5 AT+CPBP

Description	This specific command orders the product to search the phonebook for an item with the same phone number as that defined in the parameter.
Command	AT+CPBP=<PhoneNumber>
Response	+CPBP:<index>,<number>,<type>,<name>
Command	AT+CPBP=?
Response	+CPBP:<MaxRecord>,<MaxNumLength>

Example:

AT+CPBP = "88086666"

+CPBP: 3, "88086666", 129, "John"

OK

8.6 AT+CPBN

Description	This specific command instructs the product to make a forward or backward move in the phonebook.
Command	AT+CPBN=<mode>
Response	+CPBN:<index2>,<number>,<type>,<text>,<CR>,<CF>
Command	AT+CPBN=?
Response	+CPBN:(0-5)
Reference	mode: 0:First item 1:Last item 2:Next valid item in alphabetical order. 3:Next valid item in alphabetical order. 4:Last item read 5:Last item written

Example:

AT+CPBN=?

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+CPBN: (0-5) OK AT+CPBN=0

+CPBN: 15,.+331290101.,145,.John.

OK

AT+CPBN=2

+CPBN: 5,.+33147658987.,145,.Steven.

OK

AT+CPBN=2

+CPBN: 6,.+331290302.,145,.Mary.

OK

AT+CPBN=3

+CPBN: 5,.+33147658987.,145,. Steven.

OK

AT+CPBN=1

+CPBN: 6,.+331290302.,145,.Mary.

OK

AT+CPBN=2

+CPBP: 15,.+331290101.,145,. John.

OK

AT+CPBF=John.

+CPBF: 15,.+331290101.,145, John

OK

AT+CPBN=2

+CPBN: 5,.+33147658987.,145,.Frank.

OK

AT+CPBF=John

+CPBF: 15,.+331290101.,145, John

OK

AT+CPBN=4

+CPBF: 15,.+331290101.,145,. John.

OK

AT+CPBW=1,.0146290800.,129,Windy

OK

AT+CPBN=4

+CPBF:15,.+331290101.,145,.John.

OK

AT+CPBF="Frank"

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+CPBF:5,.+33147658987.,145,.Frank.

OK

AT+CPBN=4

+CPBF:15,.+3312345.,145,.8000414339FFFF.

OK

AT+CPBN=5

+CPBF:1,0146290800.,129,Windy

OK

8.7 AT+CNUM

Description	This command returns the subscriber MSISDN(s).
Command	AT+CNUM
Response	+CNUM:Phone,<PhoneNumber>,129
Command	AT+CNUM=?
Response	OK

Example:

AT+CNUM

+CNUM:Phone,"13918928056",129

8.8 AT+SDCP

Description	Delete all the "LD" or "MC" or "RC" record.
Command	AT+SDCP=<calls phonebook>
Response	OK/ERROR
Command	AT+SDCP?
Response	OK/ERROR
Command	AT+SDCP=?
Response	+SDCP:("LD","MC","RC") OK
Reference	calls phonebook:"LD","MC","RC"

8.9 AT+CSVM

Description	Set/read, enable/disable voice mailbox.

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Command	AT+CSVM=<mode>[,<number>[,<type>]]
Response	OK/ERROR
Command	AT+CSVM?
Response	OK/ERROR
Command	AT+CSVM=?
Response	+CSVM:(0-1),<nlength>,(129,145)OK
Reference	nlength:maximum length of phone number
	mode: 0:Disable voice mailbox. 1:Enable voice mailbox.
	number:voice mailbox number.
	type:type of voice mailbox number.

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Chapter 9. SIM Application Toolkit Commands

9.1 Overview of SIM Application ToolKit

Summary

SIM ToolKit, also known as "SIM Application ToolKit" introduces functionalities, which open the way to a broad range of value added services. The principle is to allow service providers to develop new applications (e.g.. for banking, travel, ticket booking, etc.) for subscribers and to download them into the SIM.

This solution allows new services to be accessible to the user by adding new SIM-based applications without modifying the handset.

Functionality

SIM Toolkit refers to the functionalities described in the GSM Technical specification 11.14. It introduces twenty-five commands for the SIM. Three classes of increasing ToolKit functionalities have been defined, with class 1 offering a subset of commands and class 3 offering the full range of commands

(See table 1 in APPENDIX B).

The SIM Application Toolkit supports:

- Profile download,
- Proactive SIM,
- Data download into SIM.
- Menu selection,
- Call control by SIM.

Profile download

The Profile Download instruction is sent by the customer application to the SIM as part of the initialization.

It is used to indicate which SIM Application Toolkit features are supported by the customer application.

The AT commands used for this operation is +STSF (SIM ToolKit Set Facilities).

Proactive SIM

A proactive SIM provides a mechanism whereby the SIM can ask the customer application to perform certain actions.

These actions include:

- Display menu,
- Display given text,
- Get user input,

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- Send a short message,
- Play the requested tone,
- Set up a call,
- Provide location information.

This mechanism allows SIM applications to generate powerful menu-driven sequences on the custom application and to use services available in the network.

The commands used for this operation are:

+STIN (SIM Toolkit Indication),

+STGI (SIM Toolkit Get Information),

+STGR (SIM Toolkit Give Response).

Data Download to SIM

Data downloading to the SIM (SMS, phonebook…)allows data or programs (Java applets)received SMS or by Cell Broadcast to be transferred directly to the SIM Application.

This feature does not need any AT command. It is transparent to the customer application.

Menu Selection

A set of menu items is supplied by the SIM Application ToolKit. The menu selection command can then used to signal to the SIM Application which menu item is selected.

The commands used for this operation are +STIN, +STGI and +STGR. Call control by SIM.

The call control mechanism allows the SIM to check all dialed numbers, supplementary service control strings and USSD strings before connecting to the network. This gives the SIM the ability to allow, bar or modify the string before the operation starts.

The commands used for this operation are :

+STCR (SIM Toolkit Control Response),

+STGR (SIM Toolkit Give Response).

9.2 Interactive Process of STK and STK user's program

On the first step, the customer application informs the FLYSCALE product which facilities are supported.

This operation is performed with the +STSF (SIM ToolKit Set Facilities) command, which also allows activating or deactivating the SIM Toolkit functionality.

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On the second step, an unsolicited result +STIN (SIM ToolKit indication) is sent by the product, indicating to the customer application which command type the SIM Application Toolkit is running on the SIM card.

The last SIM Toolkit indication can be requested by the +STIN? command.

On the third step, the customer application uses the +STGI (SIM ToolKit Get Information) command to get all the information about the SIM ToolKit command, returned by a +STIN message.

On the fourth step, the customer application uses the +STGR (SIM Toolkit Give Response)to send its response (if any) to the SIM ToolKit Application.

The +STCR (SIM Toolkit Control response) indication is an unsolicited result sent by the SIM when Call control functionality is activated and before the customer application has performed any outgoing call,

SMS, SS, or USSD.

9.3 STK AT Commands

9.3.1 AT+STSF

Description	This command allows SIM ToolKit facilities to be activated or deactivated.
Command	AT+STSF=<mode>[,"<config>"][,<Timeout>](Timeout:1~255(unit:10second)
Response	OK/ERROR
Command	AT+STSF?
Response	+STSF:<mode>[,<config>][,<Timeout>](Timeout:1~255(unit:10second)
Command	AT+STSF=?
Response	+STSF:(0-2),(160060C01F-5FFFFFFF7F),(1-255)
Reference	mode: 0:Deactivates the SIM Toolkit functionalities. 1:Activates the SIM Toolkit functionalities. 2:Configure the SIM Toolkit functionalities.

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9.3.2 AT+STIN

Description	Unsolicited result In order to allow the customer application to identify the pro-active command sent via SIM ToolKit, a mechanism of unsolicited SIM ToolKit indications (+STIN) is implemented. Last SIM toolkit indication. In order to allow the customer application to identify the pro-active command sent via SIM ToolKit, a mechanism of unsolicited SIM ToolKit indications (+STIN) is implemented.
Command	AT+STIN?
Response	+STIN:<CmdType>
Command	AT+STIN=?
Response	+STIN:(0-11) The indication is followed by the corresponding +STGI response. System will sent the corresponding information format: +STIN:<CmdType>
Reference	CmdType: 0:a ‘Setup Menu’ pro-active command has been sent from the SIM. 1:a ‘Display Text’ pro-active command has been sent from the SIM. 2:a ‘Get Inkey’ pro-active command has been sent from the SIM. 3:a ‘Get Input’ pro-active command has been sent from the SIM. 4:a ‘Setup Call’ pro-active command has been sent from the SIM. 6:a ‘Sel Item’ pro-active command has been sent from the SIM. 9:a ‘Send SMS’ pro-active command has been sent from the SIM. 99:a "End Session" has been sent from the SIM.

9.3.3 AT+STGI

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Description	This command allows to get the information (text to display, Menu information, priorities…) of a pro-active command sent from the SIM.
Command	AT+STGI=<CmdType>
Response	OK/ERROR
Command	AT+STGI=?
Response	+STGI:(0-11)

Parameter	Description
Alpha Idenitifer menu	Alpha identifier of the main menu.
<Idx> (1-255)	<Idx> (1-255)
<NbItems> (1-255)	<NbItems> (1-255)
<Alpha Idx Label>	Alpha identifier label of items in ASCII format
HelpInfo	Help information 0: No help information available. 1: Help information available.

Values when CmdType=1 (Display text)

<Prior>

0: Normal priority of display.

1: High priority of display.

<Text>

Text to display in ASCII format.

<ClearMode>

0: Clear message after a delay (3 seconds)

1: Wait for user to clear message.

Values when CmdType=2 (Get Inkey)

<Format>

0: Digit (0-9, *, #, and +)

1: SMS alphabet defaults.

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2: UCS2

<HelpInfo>

0: No help information available.

1: Help information available.

<TextInfo>

Text information in ASCII format.

Values when CmdType=3 (Get Input)

<Format>

0: Digit (0-9, *, #, and +)

1: SMS alphabet defaults.

2: UCS2

3: Unpacked format.

4: Packed format.

<EchoMode>

0: Echo off.

1: Echo on.

<SizeMin> (1-255)

Minimum length of input.

<SizeMax>(1-255)

Maximum length of input.

<HelpInfo>

0: No help information available.

1: Help information available.

<TextInfo>

Text information in ASCII format.

Values when CmdType=4 (Setup Call)

<Type>

0: Set up call but only if not currently busy on another call.

1: Set up call, putting all other calls (if any) on hold

2: Set up call, disconnecting all other calls (if any).

<CalledNb>

Information about this message.

<SubAddress>

Called party sub-address in ASCII format.

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<Class>

0: Voice call.

1: Data call.

2: Fax call

Values when CmdType=5 (Play tone)

<ToneType>

0: Tone Dial.

1: Tone Busy.

2: Tone Congestion.

3: Tone Radio ack

4: Tone Dropped.

5: Tone Error.

6: Tone Call waiting.

7: Tone Ringing.

8: Tone General beep.

9: Tone Positive beep.

10: Tone Negative beep.

<TimeUnit>

0: Time unit used is minutes.

1: Time unit used is seconds.

2: Time unit used is tenths of seconds.

<TimeInterval> (1-255)

Time required expressed in units.

<TextInfo>

Text information in ASCII format.

Values when CmdType=6 (Sel Item)

Parameter	Description	Value range
Idx	Identifier items.	1~255
NbItems	Number of items in the menu.	1~255
Alpha Idx Label	Alpha identifier label of items in ASCII format.	

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HelpInfo	Help information	0: No help information available. 1: Help information available.

Values when CmdType=9 (Send SMS)

<TextInfo>

Text information in ASCII format.

9.3.4 AT+STGR

Description	This command allows the application/user to select an item in the main menu, or to answer the following proactive commands: 1.GET INKEY 2.GET INPUT 3.SELECT ITEM 4.SETUP CALL 5.DISPLAY TEXT it is also possible to terminate the current proactive command session by sending a Terminal Response to the SIM, with the following parameters: 1.BACKWARD MOVE 2.NO RESPONSE 3.END SESSION
Command	AT+STGR=<CmdType>[,<Result>,<Data>] When CmdType=2(Get Inkey) or CmdType=3(Get Input) and need to input character string, user need to input AT+STGR=<CmdType>[,<Result>] ENTER,System returns>,User input character string, then use Ctrl+Z to confirm or ESC to quit.
Response	OK/ERROR
Command	AT+STGR=?
Response	+STGR:(0,1,2,3,4,6,11,95,96,97,98,99),(0-2),""

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Reference	CmdType: 0: Item selection in the main menu. 1: User confirmation to clear a 'Disp Text'. 2: Response for a 'Get Inkey'. 3: Response for a 'Get Input'. 4: Response for a 'Setup call'. 6: Response for a 'Sel Item'. 95: Backward move 98: No response from the user. 99: User abort.

Values when CmdType=0 (Select an item from the main menu)

<Result>

1: Item selected by the user.

2: Help information required by user.

<Data> Contains the item identifier of the item selected by the user.

Values when CmdType=1 (Confirm the display text clearing)

No values.

Values when CmdType=2 (Get Inkey)

<Result>

0: Session ended by user.

1: Response given by the user.

2: Help information required by user.

<Data> Contains the key pressed by the user.

Values when CmdType=3 (Get Input)

<Result>

0: Session ended by user.

1: Response given by the user.

2: Help information required by user.

<Data> Contains the string of characters entered by the user.

Note: For Inputs in UCS2 format, the data are entered in ASCII format. Example : For "8000410042FFFF"entered, the SIM receives 0x000x41 0x00 0x42 with UCS2 DCS. (See the Appendix E about the differentUCS2 syntaxes).

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Values when CmdType=4 (Setup call)

<Result>

0: User refuses the call.

1: User accepts call.

Values when CmdType=6 (Select Item)

<Result>

0: Session terminated by the user

1: Item selected by the user

2: Help information required by the user

3: Return to the back item

<Data> Contains the item identifier selected by the user

Sent response to SIM card:

When CmdType=95 (Backward move) ;CmdType=98 (No response from the user); CmdType=99 (No response from the user), Only after the AT+STGR command have been executed can AT+STAI be executed.

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Chapter 10. GPRS Commands

10.1 AT+CGDCONT

Description	This command specifies PDP context parameter values for a PDP context identified by the local context identification parameter, <cid>.
Command	AT+CGDCONT=[<cid>[,<pdp_type>[,<APN>[,<pdp_addr>[,<d_comp>[,<h_comp>]]]]]]
Response	OK/ERROR
Command	AT+CGDCONT?
Response	+CGDCONT: <cid>,<pdp_type>,<APN>,<pdp_addr>,<d_comp>,<h_comp><CR><LF> [+CGDCONT: <cid>,<pdp_type>,<APN>,<pdp_addr>,<d_comp>,<h_comp><CR><LF>[...]]
Command	AT+CGDCONT=?
Response	+CGDCONT:(range of supported<cid>s),<pdp_type>,(list of supported<d_comp>s and<h_comp>s)
Reference	cid: A numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. Range of values is 1 to 15.
	pdp_type:(Packet Data Protocol type),Only support IP(Internet Protocol) at present.
	APN:(Access Point Name) a string parameter, which is a logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested.
	pdp_address: a string parameter that identifies the MT in the address space applicable to the PDP.

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	d_comp: a numeric parameter that controls PDP data compression 0 : OFF (default if value is omitted), 1 : ON
	h_comp:a numeric parameter that controls PDP header compression. 0 : OFF (default if value is omitted) 1 : ON

Example:

AT+CGDCONT=1,"IP","cmnet"<cr>

OK

AT+CGDCONT=1,"IP","cmnet",,1,1

AT+CGDCONT=1, " IP ", "cm net",1,1

+CME ERR O R: 4

AT+CGDCONT= 4,"IP","cmnet","1.1.1.1",0,0

OK

10.2 AT+CGQREQ

Description	This command allows the TE to specify a Quality of Service Profile that is used when the MT sends an Activate PDP Context Request message to the network.
Command	AT+CGQREQ=[<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]]
Response	OK/ERROR
Command	AT+CGQREQ?
Response	+CGQREQ:<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean><CR><LF> [+CGQREQ: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean><CR><LF>[...]]
Command	AT+CGQREQ=?
Response	+CGQREQ: <pdp_type>,(list of supported <precedence>s, <delay>s, <reliability>s,<peak>s,and<mean>s)

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Defined values:

Parameter	Description	Values range
cid	PDP Context Identifier	1~15
precedence	numeric parameter which specifies the precedence class	0:Subscribed(from network)value used 1:High priority 2:Normal priority 3:Low priority
delay	numeric parameter which specifies the delay class	0:Subscribed(from network)value used 1~4:Delay class
reliability	numeric parameter which specifies the reliability class	0:Subscribed(from network)value used 1~6:Reliability class
peak	numeric parameter which specifies the peak throughput class	0:Subscribed(from network)value used 1:Up to 1000(8 kbit/s) 2:Up to 2000(16 kbit/s) 3:Up to 4000(32 kbit/s) 4:Up to 8000(64 kbit/s) 5:Up to 16000(128 kbit/s) 6:Up to 32000(256 kbit/s) 7:Up to 64000(512 kbit/s) 8:Up to 128000(1024 kbit/s) 9:Up to 256000(2048 kbit/s)

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mean	numeric parameter which specifies the mean throughput class	0:Subscribed(from network)value used 1:100(~0.22 bits/s) 2:200(~0.44 bits/s) 3:500(~1.1 bits/s) 4:1 000(~2.2 bits/s) 5:2 000(~4.4 bits/s) 6:5 000(~11.1 bits/s) 7:10 000(~22 bits/s) 8:20 000(~44 bits/s) 9:50 000(~111 bits/s) 10:100 000(~0.22 kbit/s) 11:200 000(~0.44 kbit/s) 12:500 000(~1.11 kbit/s) 13:1 000 000(~2.2 kbit/s) 14:2 000 000(~4.4 kbit/s) 15:5 000 000(~11.1 kbit/s) 16:10 000 000(~22 kbit/s) 17:20 000 000(~44 bits/s) 18:50 000 000(~111 bits/s)
pdp_type	PDP type	"IP":Internet Protocol "PPP":Point-to-Point Protocol

Example:

AT+CGQREQ=1,2,4,5,5,16 <cr>

OK

10.3 AT+CGQMIN

Description	This command allows the TE to specify a minimum acceptable profile which is checked by the MT against the negotiated profile returned in the Activate PDP Context Accept message.
Command	AT+CGQMIN=[<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]]
Response	OK/ERROR
Command	AT+CGQMIN?

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Response	+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean><CR><LF>[+CGQMIN:<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean><CR><LF>[...]]
Command	AT+CGQMIN=?
Response	+CGQMIN:<pdp_type>,<reliability>s,<peak>s

Parameter	Description	Values range
cid	a numeric parameter which specifies a particular PDP context .	1~15
precedence	a numeric parameter which specifies the precedence class.	0:Subscribed(from network)value used 1:High priority 2:Normal priority 3:Low priority
delay	a numeric parameter which specifies the delay class.	0:Subscribed(from network)value used 1~4:Delay class
reliability	a numeric parameter which specifies the reliability class.	0:Subscribed(from network)value used 1~6:Reliability class
peak	a numeric parameter which specifies the peak throughput class	0:Subscribed(from network)value used 1:Up to 1000(8 kbit/s) 2:Up to 2000(16 kbit/s) 3:Up to 4000(32 kbit/s) 4:Up to 8000(64 kbit/s) 5:Up to 16000(128 kbit/s) 6:Up to 32000(256 kbit/s) 7:Up to 64000(512 kbit/s) 8:Up to 128000(1024 kbit/s) 9:Up to 256000(2048 kbit/s)
mean	a numeric parameter which specifies the mean throughput class. If a value is omitted for a particular class then this class is not checked.	0:Subscribed(from network)value used 1:100(~0.22 bits/s) 2:200(~0.44 bits/s) 3:500(~1.1 bits/s) 4:1 000(~2.2 bits/s) 5:2 000(~4.4 bits/s)

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		6:5 000(~11.1 bits/s) 7:10 000(~22 bits/s) 8:20 000(~44 bits/s) 9:50 000(~111 bits/s) 10:100 000(~0.22 kbit/s) 11:200 000(~0.44 kbit/s) 12:500 000(~1.11 kbit/s) 13:1 000 000(~2.2 kbit/s) 14:2 000 000(~4.4 kbit/s) 15:5 000 000(~11.1 kbit/s) 16:10 000 000(~22 kbit/s) 17:20 000 000(~44 bits/s) 18:50 000 000(~111 bits/s)
pdp_type	PDP type	"IP":Internet Protocol "PPP":Point-to-Point Protocol

Response description:

10.4 AT+CGPCO

Description	This command is used to configure PDP Context PCO when MT sends PDP context activation information.
Command	AT+CGPCO=<type>,<user>,<password>,<cid>
Response	OK/ERROR
Command	AT+CGPCO?
Response	+CGPCO:<type>,<user>,<password>,<cid><CR><LF> [+CGPCO:<type>,<user>,<password>,<cid><CR><LF>[...]]OK
Command	AT+CGPCO=?
Response	+CGPCO:(0-1),,,(1-15)OK
Reference	type: 0:The format of password is ASCII character. 1:The format of password is PDU.

Example:

AT+CGPCO=0,"wap@cmnet.com,"wap1",1

OK

AT+CGPCO?

+CGPCO:0,,,2

+CGPCO: 0,"wap@cmnet.com,"wap1",1

OK

10.5 AT+CGATT

Description	The execution command is used to attach the MT to, or detach the MT from the GPRS service. If the MT is already in the requested state, the command is ignored and the OK response is returned. If the requested state cannot be achieved because the GPRS is not supported by the an ERROR or +CME ERROR response is returned. Any active PDP contexts will be automatically deactivated when the attachment state changes to detached.
Command	AT+CGATT=[<state>]
Response	OK/ERROR
Command	AT+CGATT=[<state>]
Response	OK/ERROR
Command	AT+CGATT?
Response	+CGATT:<state>
Command	AT+CGATT=?
Response	+CGATT:(list of supported<state>s)
Reference	state: 0:GPRS detached 1:GPRS attached

Example:

AT+CGATT=1 <cr>

OK

10.6 AT+CGACT

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Description	The execution command is used to activate or deactivate the specified PDP context (s). After the command has completed, the MT remains in V.25ter command state. If any PDP context is already in the requested state, the state for that context remains unchanged. If the requested state for any specified context cannot be achieved, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command.
Command	AT+CGACT=[<state>[,<cid>[,<cid>[,...]]]]
Response	OK/ERROR
Command	AT+CGACT?
Response	+CGACT:<cid>,<state><CR><LF>[+CGACT:<cid>,<state><CR><LF>[...]]
Command	AT+CGACT=?
Response	+CGACT:(list of supported<state>s)
Reference	state: 0:PDP context deactivated 1:PDP context activated
	cid:a numeric parameter which specifies a particular PDP context. (1~15). Before the activation of the context, the MT has to attached himself to the GPRS network if necessary.

Example:

AT+CGACT=1,1 <cr>

OK

AT+CGACT=0,1 <cr>

OK

10.7 AT+CGPADDR

Description	The execution command returns a list of PDP addresses for the specified context identifiers.
Command	AT+CGPADDR=[<cid>[,<cid>[,...]]]
Response	+CGPADDR:<cid>,<pdp_addr><CR><LF>[+CGPADDR:<cid>,<pdp_addr><CR><LF>[...]]

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Command	AT+CGPADDR=?
Response	+CGPADDR:(list of supported<cid>s)
Reference	cid:a numeric parameter which specifies a particular PDP context definition. If no <cid> is specified, the addresses for all defined contexts are returned.
	pdp_addres: a string that identifies the MT in the address space applicable to the PDP.

Example:

AT+CGPADDR=1 <cr>

AT+CGPADDR=1,"104.192.5.4"

OK

AT+CGPADDR=? <cr>

AT+CGPADDR=(1-15)

OK

10.8 AT+CGDATA

Description	This command causes the MT to perform the necessary actions to set up communication between the TE and the network. This may include performing a GPRS attach and one PDP context activation.
Command	AT+CGDATA=[<L2P>,[<cid>[,<cid>[,…]]]]
Response	CONNECT/ERROR
Command	AT+CGDATA=?
Response	+CGDATA:(list of supported<L2P>s)
Reference	L2P:a string parameter which indicates the layer 2 protocol to be used.
	cid:PDP Context Identifier. Value range:1~15

Example:

AT+CGDATA="PPP", 1 <cr>

CONNECT

10.9 AT+CGAUTO

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Description	The set command disables or enables an automatic positive response(auto-answer)to the receipt of a Request PDP Context Activation message from the network..
Command	AT+CGAUTO=[<state>]
Response	OK/ERROR
Command	AT+CGAUTO?
Response	+CGAUTO:<state>
Command	AT+CGAUTO=?
Response	+CGAUTO:(list of supported<state>s)
Reference	state: 0:turn off automatic response for GPRS only 1:turn on automatic response for GPRS only 2:modem compatibility mode, GPRS only 3:modem compatibility mode, GPRS and circuit switched calls (default)

Example:

AT+CGAUTO=0 <cr>

OK

10.10 AT+CGANS

Description	This command is used to set MT response to PDP context on GPRS network.
Command	AT+CGANS=[<response>,[<L2P>,[<cid>]]]
Response	OK/ERROR
Command	AT+CGANS=?
Response	+CGANS:(list of supported<response>s),(list of supported<L2P>s)
Reference	response:is a numeric parameter which specifies how the request should be responded to. 0:reject the request 1:accept and request that the PDP context be activated
	L2P:a string parameter which indicates the layer 2 protocol to be used (see +CGDATA command).

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	cid:a numeric parameter which specifies a particular PDP context definition. Values range:1~15

Example:

+CRING: GPRS "IP","104.156.74.8"

AT+CGANS=1 <cr>

CONNECT

10.11 AT+CGCLASS

Description	The set command is used to set the MT to operate according to the specified GPRS mobile class.
Command	AT+CGCLASS=[<class>]
Response	OK/ERROR
Command	AT+CGCLASS?
Response	+CGCLASS:<class>
Command	AT+CGCLASS=?
Response	+CGCLASS:(list of supported<class>s)
Reference	class:: a string parameter which indicates the GPRS mobile class (in descending order of functionality) B:class B CC:class C in circuit switched only mode(lowest) If the MT is GSM attached when the set command is issued with a <class> = CG specified, a GSM detach request is sent to the network.

Example:

AT+CGCLASS="CC" <cr>

OK

AT+CGCLASS="A" <cr>

ERROR

10.12 AT+CGEREP

Description	This command is used to control unsolicited GPRS event reporting.

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Command	AT+CGEREP=[<mode>[,<bfr>]]
Response	OK/ERROR
Command	AT+CGEREP?
Response	+CGEREP:<mode>,<bfr>
Command	AT+CGEREP=?
Response	+CGEREP
Reference	mode: 0:Buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones are discarded. 1:Discard unsolicited result codes when MT-TE link is reserved(e.g. In one line data mode); otherwise forward them directly to the TE. 2:Buffer unsolicited result codes in the MT when MT-TE link is reserved(in on line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE.
	bfr: 0:MT buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered. 1:MT buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1 or 2 is entered.

Example:

AT+CGEREP=0,1 <cr>

OK

AT+CGEREP=2,0 <cr>

OK

10.13 AT+CGREG

Description	The set command controls the presentation of an unsolicited result code +CGREG:
Command	AT+CGREG=[<n>]
Response	N=1+CGREG:<stat> N=2+CGREG:<stat>[,<lac>,<ci>]

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Command	AT+CGREG?
Response	+CGREG:<n>,<stat>[,<lac>,<ci>]/+CME ERROR:<err>
Command	AT+CGREG=?
Response	+CGREG:(list of supported<n>s)
Reference	n: 0:disable network registration unsolicited result code 1:enable network registration unsolicited result code +CGREG: <stat> 2:enable network registration and location information unsolicited result code +CGREG: <stat>[,<lac>,<ci>]
	stat: 0:not registered, ME is not currently searching a new operator to register to 1:registered, home network 2:not registered, but ME is currently searching a new operator to register to 3:registration denied 4:unknown 5:registered, roaming
	lac:string type; two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)
	ci:string type; two byte cell ID in hexadecimal format

Example:

AT+CGREG=1 <cr>

AT+CGREG:<stat>

AT+CGREG=2 <cr>

AT+CGREG: <stat>[,<lac>,<ci>]

10.14 AT+CGSMS

Description	Select service for MO SMS messages
Command	AT+CGSMS=[<service>]
Response	OK/ERROR
Command	AT+CGSMS?
Response	+CGSMS:<service>

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Command	AT+CGSMS=?
Response	+CGSMS:(list of currently available<service>s)
Reference	service:.,specified service type: 0:GPRS 1:circuit switched 2:GPRS preferred(use circuit switched if GPRS not available) 3:circuit switched preferred(use GPRS if circuit switched not available)

Note: Network does not support GPRS SMS at present.

10.15 AT+CRC

Description	This command allows more detailed ring information for an incoming call (voice or data). Instead of the string "RING", an extended string is used to indicate which type of call is ringing (e.g. +CRING: VOICE).
Command	AT+CRC=[<n>]
Response	OK/ERROR
Command	AT+CRC?
Response	+CRC:[<n>]
Command	AT+CRC=?
Response	+CRC:(list of supported<n>s)
Reference	n: 0:disable extended reports 1:enable extended reports

Note: The product <type> only supports voice at present.

Example:

AT+CRC=1<cr>

OK

10.16 AT+CR

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Description	This command enables a detailed type of service reporting in the case of incoming or outgoing data calls. Before sending the CONNECT response to the application, the product will specify the type of data connection that has been set up.
Command	AT+CR=[<n>]
Response	OK/ERROR
Command	AT+CR?
Response	+CR:[<n>]
Command	AT+CR=?
Response	+CR:(list of supported<n>s)
Reference	n:mode 0:disable extended reports 1:enable extended reports

Example:

AT+CR=1 <cr>

OK

10.17 AT+CEER

Description	This command gives the cause of call release when the last call set up (originating or answering) failed. Release cause reference to Appendixes 17.4 failure cause from GSM 04.08 recommendation.
Command	AT+CEER
Response	Please refer to: Form 1-3 +CEER:Error<xxx>

Example:

AT+CEER

+CEER : Error 3

OK

10.18 Extension of ATD

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Description	Built the connections between terminal devices and networks, in order to send data. Ensure GPRS is attached and PDP CONTEXT ACTIVATION Is enabled.
Command	ATD*<GPRS_SC_IP>[***<cid>]#
Response	CONNECT/ERROR
Reference	GPRS_SC_IP:<GPRS_SC_IP>: (GPRS Service Code for IP) a digit string (value 99), which identifies a request to use the GPRS with IP (PDP types IP and PPP) With the value of 99.
	cid:a numeric parameter which specifies a particular PDP context definition.Values range:1~15.Default value is 1.

Example:

ATD*99#<cr> or

ATD*99***1#<cr>

CONNECT

10.19 AT+ CGEQREQ

Description	When sending a Activate PDP Context request information to network end,it will appoint a UMTS QOS parameter,the parameter will be sated in MT.
Command	AT+CGEQREQ=[<pdp_id>[,<traffic_class>[,<max_bt_ul>[,<max_bt_dl>[,<guaranteed_bt_ul>[,<guaranteed_bt_dl>[,<delivery_order>[,<max_sdu_size>[,<sdu_error_ratio>[,<residual_ber>[,<delivery_of_err_sdu>[,<transfer_delay>[,<traffic_handling_priority>]]]]]]]]]]
Response	OK/ERROR
Command	AT+CGEQREQ?

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Response	+CGEQREQ: <pdp_id>,<traffic_class>,<max_bt_ul>,<max_bt_dl>,<guaranteed_bt_ul>,<guaranteed_bt_dl>,<delivery_order>,<max_sdu_size>,<sdu_error_ratio>,<residual_ber>,<delivery_of_err_sdu>,<transfer_delay>,<traffic_handling_priority><CR><LF> [+CGEQREQ: <pdp_id>,<traffic_class>,<max_bt_ul>,<max_bt_dl>,<guaranteed_bt_ul>,<guaranteed_bt_dl>,<delivery_order>,<max_sdu_size>,<sdu_error_ratio>,<residual_ber>,<delivery_of_err_sdu>,<transfer_delay>,<traffic_handling_priority><CR><LF>[...]]
Command	AT+CGEQREQ=?
Response	+CGEQREQ:<pdp_id>,(list of supported<traffic_class>s),(list of supported<max_bt_ul>s),(list of supported<max_bt_dl>s), (list of supported<guaranteed_bt_ul>s), (list of supported<guaranteed_bt_dl>s), (list of supported<delivery_order>s), (list of supported<max_sdu_size>s), (list of supported<sdu_error_ratio>s), (list of supported<residual_ber>s), (list of supported<delivery_of_err_sdu>s), (list of supported<transfer_delay>s), (list of supported<traffic_handling_priority>s)
Reference	pdp_id:(PDP Context Identifier)(range:1-15),specified PDP context ID number.
	traffic_class:traffic class,range 0-4, 0-conversational 1-streaming 2-interactive 3-background 4-subscribed value
	max_bt_ul:Maximum bitrate UL,range 0-8640(kbits/s) max_bt_dl:Maximum bitrate D L,range 0-8640(kbits/s)
	guaranteed_bt_u l:Guaranteed bitrate UL,range 0-8640(kbits/s)
	guaranteed_bt_d l:Guaranteed bi t rate DL,range 0-8640(kbits/s

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	deliver y_order:Delivery order,range 0-3,Set UMTS transmissio to provide in-sequence or not. SDU delivery 0-no 1-yes 2-subscribed value. The others are retention.
	max_sdu_size:Maximum SDU size indicates the maximum allowed SDU size (from 10 octets to 1,520 octets).
	sdu_error_ratio:SDU error ratio,indicates the maximum allowed fraction of SDUs lost or detected as erroneous.
	residual_ber:Residual bit error ratio indicates the maximum allowed fraction of SDUs lost or detected as erroneous.
	delivery_of_err_sdu:Delivery of erroneous SDUs,range 0-3,indicates if erroneous SDUs are delivered or discarded. SDUs 0-no 1-yes 2-no detect 3-subscribed value Others are reserved value.
	transfer_delay:Transfer delay,range 0-4000,the time of SDU transfer from one SAP to another SAP,(millisecond level)
	traffic_handling_priority:Traffic handling priority,range:0-3,indicates the relative importance of all SDUs belonging to a specific GPRS bearer compared with all SDUs of other GPRS bearers.
	Other parameters are not supported by now.

Example:

AT+CGEQREQ =1,1,4000,8000,2000,4000,1,1520,,1,4000,3

OK

10.20 AT+ CGEQMIN

Description	Set the minimal value of acceptable UMTS QOS parameters,and recomfirm based on the information that returned from Activate/Modify PDP Context Accept.
Command	AT+CGEQMIN=[<pdp_id>[,<traffic_class>[,<max_bt_ul>[,<max_bt_dl>[,<guaranteed_bt_ul>[,<guaranteed_bt_dl>[,<delivery_order>[,<max_sdu_size>[,<sdu_error_ratio>[,<residual_ber>[,<delivery_of_err_sdu>[,<transfer_delay>[,<traffic_handling_priority>]]]]]]]]]]]]
Response	OK/ERROR
Command	AT+CGEQMIN?
Response	+CGEQMIN: <pdp_id>,<traffic_class>,<max_bt_ul>,<max_bt_dl>,<guaranteed_bt_ul>,<guaranteed_bt_dl>,<delivery_order>,<max_sdu_size>,<sdu_error_ratio>,<residual_ber>,<delivery_of_err_sdu>,<transfer_delay>,<traffic_handling_priority><CR><LF> [+CGEQMIN: <pdp_id>,<traffic_class>,<max_bt_ul>,<max_bt_dl>,<guaranteed_bt_ul>,<guaranteed_bt_dl>,<delivery_order>,<max_sdu_size>,<sdu_error_ratio>,<residual_ber>,<delivery_of_err_sdu>,<transfer_delay>,<traffic_handling_priority><CR><LF>[...]]
Command	AT+CGEQMIN=?
Response	+CGEQMIN:<pdp_id>,(list of supported<traffic_class>s),(list of supported<max_bt_ul>s),(list of supported<max_bt_dl>s), (list of supported<guaranteed_bt_ul>s), (list of supported<guaranteed_bt_dl>s), (list of supported<delivery_order>s), (list of supported<max_sdu_size>s), (list of supported<sdu_error_ratio>s), (list of supported<residual_ber>s), (list of supported<delivery_of_err_sdu>s), (list of supported<transfer_delay>s), (list of supported<traffic_handling_priority>s)
Reference	pdp_id:(PDP Context Identifier)specified PDP context ID number

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	traffic_class:traffic class,range 0-4, 0-conversational 1-streaming 2-interactive 3-background 4-subscribed value
	max_bt_dl:Maximum bitrate DL, indicates the maximum number of bits delivered by the network within a period of time (from 0 to 8,640 Kbps). max_bt_ul:Maximum bitrate UL,indicates the maximum number of bits delivered to the network within a period of time (from 0 to 8,640 Kbps).
	guaranteed_bt_ul:Guaranteed bitrate UL,indicates the guaranteed number of bits delivered to the network within a period of time (from 0 to 8,640 Kbps).
	guaranteed_bt_dl:Guaranteed bitrate DL,indicates the guaranteed number of bits delivered to the network within a period of time (from 0 to 8,640 Kbps).
	delivery_order:Delivery order,range 0-3,indicates if there is in-sequence SDU delivery or not. SDU delivery 0-no 1-yes 2-subscribed value. The others are reserved value.
	max_sdu_size:Maximum SDU size,indicates the maximum allowed SDU size (from 10 octets to 1,520 octets)
	sdu_error_ratio:SDU error ratio,indicates the maximum allowed fraction of SDUs lost or detected as erroneous.
	residual_ber:Residual bit error ratio is a receive quality metric in digital transmission, one of several used to quantify the accuracy of the received data.

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	delivery_of_err_sdu:Delivery o f erroneous SDUs,range 0-3,indicates if erroneous SDUs are delivered or discarded. 0-no 1-yes 2-no detect 3-subscribed value The others are reserved value.
	transfer_delay:Transfer dela y,range 0-4000,the time of SDU transfer from one SAP to another SAP,(millisecond level)
	traffic_handling_priority:Traffic handling priority,range:0-3,indicates the relative importance of all SDUs belonging to a specific GPRS bearer compared with all SDUs of other GPRS bearers.
	Other parameters are not supported by now.

Example:

AT+CGEQMIN=1,1,2000,4000,1000,2000,1,1520,,1,2000,3

OK

10.21 AT+NETAPN

Description	This command is used to name a APN
Command	AT+NETAPN="<apn>"
Response	OK +CME ERROR:<error>
Command	AT+NETAPN=?
Response	+NETAPN:,, OK
Reference	apn:GPRS access point

Example:

AT+NETAPN="cmnet"

OK

10.22 AT+SOCKET

Description	This command is used to config parameter of the server that would be connected.
Command	AT+SOCKET=<id>,"<type>","<addr>",<port>
Response	OK +CME ERROR:<error>
Command	AT+SOCKET=?
Response	+SOCKET: (0-9),("TCP","UDP"),,(0-65535) OK
Reference	id: socket connecting channel ID,when connecting a single server, set id to be 0. type: Connecting type, TCP or UDP addr: Sever domain name address or IP address port: Server port number

Example:

AT+SOCKET=0,"TCP","pop3.sina.com.cn",110

OK

10.23 AT+IPOPEN

Description	This command allows to establish a connection
Command	AT+IPOPEN=<id>
Response	OK +CME ERROR:<error>
Command	AT+IPOPEN=?
Response	+IPOPEN: (0-9) OK
Reference	id: socket connecting channel ID

Note: After sending AT+IPOPEN=0, It will response: +IPOPEN: ID if connection is successful, the data returned from server will be showed on the Super Terminal.

Example:

AT+IPOPEN=0

OK

+IPOPEN: 0

+IPDATA:0,pop3.sina.com.cn,110,29

2B4F4B20706F70332070726F787920736572766572207265616479D0A

10.24 AT+IPSEND

Description	This Command is used to send data on the TCP or UDP connection that has been established already. Ctrl-Z is used as a termination symbol.
Command	AT+IPSEND=<id>,<len>
Response	> // Input the command in the correct format, input the data would be sent after ">" or "+CME ERROR: <error>" returns. it will response OK if the module has executed the command. It will response "+IPSEND: ID,LEN //" (length of data that has been sent)if the data has been sent successfully, otherwise the response will be "+CME ERROR: <error>".
Command	AT+IPSEND=?
Response	+IPSEND: (0-9),(0-1024) OK
Reference	id: socket connecting channel ID,should be set to 0 when connecting a single server. len: length,unit is BYTE(LEN should be more than 1)

Example:

AT+IPSEND=0,6

> 213432894783

+IPSEND: 0,6

10.25 AT+IPCLOSE

Description	This command is used to close TCP or UDP connection. After this command, data can not be sent or received any more. However, he PDP context is still active when connecting GPRS network and CSD is still connected when connecting GSM network.
Command	AT+IPCLOSE=<id>
Response	+IPCLOSE: ID

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Command	AT+IPCLOSE=?
Response	+IPCLOSE: (0-9) OK
Reference	id: socket connecting channel ID

Note: It will response "+IPCLOSE=0" if close successfully.

Example:

AT+IPCLOSE=0

+IPCLOSE:0

OK

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Chapter 11. Specific Commands

11.1 AT+SMUX

Description	Configure the multiplexing mode,but the default mode will be used,after the product reboot.
Command	AT+SMUX=<mode>
Response	OK/ERROR
Command	AT+SMUX?
Response	+SMUX:<mode> OK
Command	AT+SMUX=?
Response	+SMUX:<mode> OK
Reference	mode: 0:close mixed mode.AT command is unavailable when the module is transmitting data. 1:open mixed mode.AT command is available when the module is transmitting data.

11.2 AT+S32K

Description	Allow or forbid entering of sleep mode
Command	AT+S32K=<mode>
Response	OK/ERROR
Command	AT+S32K?
Response	+S32K:<mode> OK
Command	AT+S32K=?
Response	+S32K:(0-1) OK
Reference	mode: 0:power saving mode is unavailable. 1:power saving mode is available.

Note: <mode> would not saved in NV, default value is 0.

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11.3 AT+SIND

Description	Set some status of a system which sends indication automatically ·Indication status of the SIM card. ·Indication status of the call. ·Indication status of the AT command.
Command	AT+SIND=<IndLevel>
Response	OK/ERROR
Command	AT+SIND?
Response	+SIND:<IndLevel>
Command	AT+SIND=?
Response	+SIND:(0-2047)OK
Reference	IndLevel: 1(bit-0):SIM card Insert/Remove indications 2(bit-1):Calling party alert indication 4(bit-2):Indication that product is ready(except for phonebooks, AOC, SMS), but still in emergency mode 8(bit-3):Indication that the product is ready to process all AT commands 16(bit-4):Indication that a new call identifier has been created 32(bit-5):Indication that a call has been released . 64(bit-6): Network service available indication 128(bit-7):Network lost indication 256(bit-8):Audio on indication 512(bit-9):SIM phonebook status indication. If <IndLevel>=0(default value), no indication +SIND:<IndNb>will be sent. Above value is available.The value range is 0<=IndLevel<=2047. Value set by AT+SIND command will be stored in FLASH automatically.

Indication format: +SIND: <event>[,<idx>]

call id If the indication is about SIM card phonebook:

+SIND: <event>,<phonebook>,<status>,.,<phonebook>,<status>

<phonebook> : SIM phonebook () (.SM., .FD, .LC., .MC.)

Parameter description:

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Parameter	Description
idx	Called party ID number
status	0:Not load from SIM
	1:loaded from SIM
event	Support events: 0:SIM card doesn't exist or is not available. 1:SIM exists. 2:Call ring. 3:Indication that the product is partly ready to process AT commands. 4:Indication that the product is partly ready to process all AT commands 5:A new call identifier has been created. 6:Call with id<idx>has been released. 7:Network is ready to process emergency call. 8:Network lost. 9:Audio is on. 10:The status of SIM card phone book after Initialization. 11:Network Registration successful

11.4 AT+STMF

Description	store and delete the file in MIDI format
Command	AT+STMF=<index>,<block_num>,<block_length>
Response	>midi_data^z OK
Command	AT+STMF?
Response	+STMF:<remain_size>,<total_size>
Reference	index:Values range:16~47(1-15 are module configured MIDI)
	block_num:0-255 block num of input files(0: delete respective midi)
	block_length:the length of 1-500 files
	remain_size:0-192k(space left to store midi)
	total_size:192k, maximum space of file to store midi

Example:

Write the first data block

AT+STMF=16,1,20

>45D678F3E8F9D34249A9^z

OK

Write the second data block:

AT+STMF=16,2,20

>87D675F3E8F9C34249A9^z

OK

Get the size of file 16 :

AT+STMF=16

+STMF:40

OK

Delete MIDI file 16:

AT+STMF=16,0

OK

11.5 AT+SBAND

Description	select the frequency of module(such as GSM900)
Command	AT+SBAND=<value>
Response	OK
Command	AT+SBAND?
Response	+ SBAND: <current value>
Command	AT+SBAND=?
Response	+ SBAND: (0-14)

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Reference	value: 0:GSM900 1:DCS1800 2:PCS1900 3:GSM850 4:GSM900 & DCS1800 5:GSM850 & GSM900 6:GSM850 & DCS1800 7:GSM850 & PCS1900 8:GSM900 & PCS1900 9:GSM850 & GSM900 & DCS1800 10:GSM850 & GSM900 & PCS1900

11.6 AT+SSAM

Description	Configure the sound mode
Command	AT+SSAM=<mode>
Response	OK
Command	AT+SSAM?
Response	+SSAM:<current value>
Command	AT+SSAM=?
Response	+SSAM:(0-2)
Reference	mode: 0:Hand hold mode 1:Hand free mode

11.7 AT+SSAP

Description	Config the parameter of audio gain, but the default mode will be used,after the product reboot.
Command	AT+SSAP=<mode>,<type>,<PGA_gain>,<digital_gain>
Response	OK
Command	AT+SSAP?

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Response	+SSAP: <mode>,<UL_PGA_gain>,<UL_digital_gain>,<DL_PGA_gain>,<DL_digital_gain> <CR><LF> [+SSAP: <mode>,<UL_PGA_gain>,<UL_digital_gain>,<DL_PGA_gain>,<DL_digital_gain> <CR><LF>] [[+SSAP: <mode>,<UL_PGA_gain>,<UL_digital_gain>,<DL_PGA_gain>,<DL_digital_gain> <CR><LF>]] OK
Command	AT+SSAP=?
Response	+SSAP:(0-2),(0-1),(0-11),(0-32767)OK
Reference	mode : 0 :Set HANDHOLD gain parameter 1 :Set HANDFREE gain parameter 2 :Set EARPHONE gain parameter
	type : 0 :Set downlink gain parameter 1 :Set uplink gain parameter
	PGA_gain :the range of PGA_gain is between 0 and 11, which is setting the stimulant gain.
	digital_gain : the range of digital_gain is between 0 and 32767, which is setting the digital gain.

Note: Improper parameter configuration may ceases echo and distortion.

Example:

AT+SSAP?

+SSAP:0,7,12288,0,4096

+SSAP:1,6,32767,2,4096

+SSAP:2,6,4595,2,5785

OK

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11.8 AT+SPEAKER

Description	Config MIC and SPEAKER channels
Command	AT+SPEARKER=<mic_mode>,<spk_mode>
Response	OK/ERROR
Command	AT+SPEAKER?
Response	+SPEAKER:<mic_mode>,<spk_mode> OK
Command	AT+SPEAKER=?
Response	+SPEAKER:(0-1),(0-1) OK
Reference	mic_mode:(Default value is 0) 0:MIC mode 1:MIC aux mode
	spk_mode:(Default value is 0) 0:SPEAKER mode 1:SPEAKER aux mode

11.9 AT+SEQT

Description	Set the speaker equalizer type
Command	AT+SEQT=<type>
Response	OK/ERROR
Command	AT+SEQT?
Response	+SEQT:<type> OK
Command	AT+SEQT=?
Response	+SEQT:(0-3) OK
Reference	type:(Default value is 0) 0:Normal type 1:BASS type 2:ALT type 3:Special effect

Note: Module does not support these functions at present.

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11.10 AT+SSEA

Description	Configure the sound parameters in project mode
Command	AT+SSEA=<mode><CR>>DATA<ctrl-z/ESC>
Response	OK/ERROR
Command	AT+SSEA=?
Response	+SSEA:(0-11)
Reference	Configured parameters Type 0:Set sidetone digital gain parameter 1:Set hand hold gain 1 parameter 2:Set free hand digital gain 1 parameter 3:Set hand hold analog gain parameter 4:Set free hand analog gain parameter 5:Set main MIC equalizer parameter 6:Set supplementary MIC equalizer parameter 7:Set main SPEAKER equalizer parameter 8:Set supplementary SPEAKER equalizer parameter 10:Set hand hold digital gain 2 parameter 11:Set free hand digital gain 2 parameter
	DATA: DATA are parameter values of upload an downloaded transfer. It is in AUTO_TEST_DATA_T ASCII mode and in the same row with.

Structural definition of AUDIO_TEST_DATA_T is as follows:

typedef struct

{

int16 UL_equalizer_coeff[33];

int16 DL_equalizer_coeff[33];

int16 UL_PGA_gain;

int16 DL_PGA_gain;

int16 UL_digital_gain;

int16 DL_digital_gain;

int16 UL_digital_scale;

int16 DL_digital_scale;

int16 midi_PGA_gain_base;

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int16 Digital_sidetone_gain;

int16 DL_IIR1_coeff[6];

int16 DL_IIR2_coeff[6];

int16 reserved[2];

} AUDIO_TEST_DATA_T;

11.11 AT+SDMUT

Description	This command allows to mute the downlink voice.
Command	AT+SDMUT=<mode>
Response	OK/ERROR
Command	AT+SDMUT?
Response	+SDMUT:<mode>OK
Command	AT+SDMUT=?
Response	+SDMUT:<supported value>OK
Reference	mode: 0:downlink voice mute off 1:downlink voice mute on

11.12 AT+SRWD

Description	Read and write DSP(a word or a a reserved area of storage)
Command	AT+SRWD=<R/W>,<D/P>,<length>,"<address>"
Response	OK(write) SRWD:data(write)
Reference	R/W: 0:Read DSP 1:Write DSP
	D/P: 0:Data area 1:Program area
	length:length of data field,0 is a word.
	address:The source address of DSP with four character strings to be read & written with four character strings. Values range: 0xFA00~0xFFFF

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Note: The command does not support to read and write in the reserved area.

Example:

AT+SRWD=1,0,0,"FA00"(ENTER)

>45A8(Ctrl+Z Confirm ,Esc quit)

OK

AT+SRWD=0,0,0,"FA00" SRWD: 45A8

11.13 AT+SMGF

Description	Users can use this command more than once to store more than (continuous) data blocks of block_num in the same <file_name>.
Command	AT+SMGF=<mode>, ["<file name>", <block_num>,<block_length>,<block_total>,"<new file name>"]
Response	OK/ERROR
Command	AT+SMGF?
Response	+SMGF:(free space),(used space) OK
Command	AT+SMGF=?
Response	+SMGF:(0-5),"",(0-65535),(1-1024),(0-65535),"" OK
Reference	mode: 0:Read a file.. 1:Read the size of file. 2:Delete a file. 3:Add a file. 4:Replace a file. 5:Rename a file.
	block_num:1-65535 of transferred files, the first block must be 1.
	block_length:the length of the downloaded data block(its max value is 1024), which must be consistent with the length of transferred data.
	block_total:total number of downloaded data block with a range of 1-65535.
	file name:the name in HEX style(includes direct path)

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	new file name:modified file name in HEX style(includes direct path)

Example:

Read a file "FILE/PIC/GF.GIF":

AT+SMGF=0,"46494C452F5049432F47462E474946",0

+ SMGF: <total num>,<block ID>,< block size>,data

OK

Read the size of a "FILE/PIC/GF.GIF":

AT+SMGF=1, "46494C452F5049432F47462E474946"

+ SMGF:<file size>

OK

Delete a "FILE/PIC/GF.GIF":

AT+SMGF=2, " 46494C452F5049432F47462E474946"

Ok

Add a "FILE/PIC/GF.GIF":

AT+SMGF=3, " 46494C452F5049432F47462E474946",1,10, 10

>A5b7d7a089 <ctrl-Z>

OK

AT+SMGF=3, " 46494C452F5049432F47462E474946",2,10, 10

>A5b7d7a089 <ctrl-Z>

OK

Replace a file "FILE/PIC/GF.GIF"

AT+SMGF=4, " 46494C452F5049432F47462E474946",1,10

>A5b7d7a089 <ctrl-Z>

OK

Rename"FILE/PIC/OLD.GIF"as"FILE/PIC/NEW.GIF":

AT+SMGF=5,"46494C452F5049432F4F4C442E474946",0,1,0,"46494C452F5049

432

F4E45572E474946"

OK

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11.14 AT+SMGD

Description	This command is used to manage directory.
Command	AT+SMGD=<mode>,"<dir name>",["<new dir name>"]
Response	OK/ERROR
Command	AT+SMGD=?
Response	+SMGD:(0-3),"","""OK
Reference	mode: 0:Query a directory 1:Add a directory 2:Delete a directory 3:Rename a directory
	dir name:directory name in HEX style(includes direct path)

Example:

Query directory "FILE/PIC":

AT+SMGD=0, " 46494C452F504943"

+SMGD:<attrib>…….

OK

Add directory "FILE/PIC":

AT+SMGD=1, " 46494C452F504943"

OK

Delete directory "FILE/PIC":

AT+SMGD=2, " 46494C452F504943"

OK

Rename directory "FILE/PIC" to "FILE/MIDI":

AT+SMGD=3, " 46494C452F504943"," 46494C452F4D494449"

OK

11.15 AT+SSMP

Description	This command is used to require ME be sent in maximum power
Command	AT+SSMP

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Response	OK/ERROR

11.16 AT+SSGF

Description	This command is used to configure GPIO direction.
Command	AT+SSGF=<gpio_id>,<type>,<value>
Response	[+SSGF: <value>] OK/ERROR
Command	AT+SSGF=?
Response	+SSGF:(0-255),(0-1),(0-1) OK
Reference	gpio_id:the max range of gpio_id is between 0 and 255. The available id number is determined by the chip type.
	type: 0:Set the GPIO direction. 1:Query the GPIO direction.
	value:(type=1,the parameter will be invalid) 0:Set the GPIO to input direction when type=0 1:Set the GPIO to output direction when type=1

Note: this command will change GPIO function, and inappropriate setting will cause system exception.

Example:

Set GPIO 6 to output direction:

AT+SSGF=6,0,1

OK

Get GPIO 6 direction setting:

AT+SSGF=6,1

+SSGF:1

OK

11.17 AT+SSGS

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Description	AT+SSGS: set and query GPIO level. The operation will fail when the appointed gpio direction does not set to output direction
Command	AT+SSGS=<gpio_id>,<type>,<value>
Response	[+SSGS:<value>]OK/ERROR
Command	AT+SSGS=?
Response	+SSGF:(0-255),(0-1),(0-1) OK
Reference	gpio_id:the max range of gpio_id is between 0 and 255. The available id number is determined by the chip type.
	type: 0:Set GPIO level 1:Get GPIO level
	value:this parameter is invalid when the type set to 1 0:Set the GPIO level to low(0) when type=0 1:Set the GPIO level to hign(1) when type=1

Example:

AT+SSGF=7,0,1

OK

AT+SSGS=7,0,0

OK

AT+SSGS=7,1

+SSGS: 0

OK

11.18 AT+SNVM

Description	This command allows to manage the NVITEM data through NVITEM id.
Command	AT+SNVM=<type>,<nvitem_id>[,<nvitem_id_end>]
Response	OK/ERROR
Command	AT+SNVM=?
Response	+SNVM:(0-4),(0-1199),(0-1199) OK
Reference	type:Please refer to the following table.
	nvitem_id:nvitem_id:NVITEM ID.Values range:0~1199

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	nvitem_id_end: This parameter is valid only when parameter<type>=4,and will be discard in others case.When<type>=4,this command will delete NVITEM data from <nvitem_id> to <nvitem_id_end>. If <nvitem_id_end> is absence, then only <nvitem_id> will be deleted.The parameter <nvitem_id_end> should equal or lager than <nvitem_id> if available.

type parameter description:

Value	Description
0	<type>=0 means to read the appointed NEITEM id's data and the data will be output as HEX format.The output of this command as the following: +SNVM: <length>,<HEX_DATA> OK Which the <length> indicates the NVITEM data size in binary.
1	<type>=1 means to write NVITEM id's data into module and the original data will be erased if existing without any prompt. This command will output ">" as a hint for input data. Using <ctrl+z> as the terminater character of input or <ESC> to cancel the input data. The data length of a NVITEM id will not exceed 512 bytes in binary.
2	<type>=2 means to replace the appointed NVITEM id's data. This command will write data into module if the destination NVITEM id is unoccupied and will erase the data if appointed NVITEM id's data exists already. This command will output ">" as a hint for input data. Using <ctrl+z> as the terminater character of input or <ESC> to cancel the input data. The data length of a NVITEM id will not exceed 512 bytes in binary.
3	<type>=3 means to query the appointed NVITEM id's data size and the output format as the following: +SNVM: <length> OK

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4	<type>=4 means to delete the appointed NVITEM id range data. The NVITEM id range from <nvitem_id> to <nvitem_id_end>, and if <nvitem_id_end> is absence, then only the <nvitem_id> will be erased. <nvitem_id>: indicates the current operate NVITEM id.The <NVITEM_ID> range is from 0 to 1199. <nvitem_id_end>: This parameter is valid only when parameter <type>=4, and will be discard in others case. When <type>=4, this command will delete NVITEM data from <nvitem_id> to <nvitem_id_end>. If <nvitem_id_end> is absence, then only <nvitem_id> will be deleted. The parameter <nvitem_id_end> should equal or lager than <nvitem_id> if available.

Example:

AT+SNVM=1,6

>30313233343536<ctrl+z>

OK

11.19 AT+SADM

Description	Set and read the information of Audio mode.
Command	AT+SADM=<type> [, <value> [<CR><LF><data><ctrl+Z/ESC>]] When <type>=0 , other parameters are invalid.

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Response	Response: +SADM: <n> OK/ ERROR When <type>=1 , <value> must be input, other parameters are invalid: <value>is index of Audio mode, the length should be less than the number of Audio mode Response: +SADM: <index>, <name> OK/ERROR When <type>=2 , <value> must be input, other parameters are invalid: <value>is index of Audio mode, Response: +SADM: <index>, <name>, <data> OK/ ERROR When <type>=3 or 5, <value>,<data>must be input: <value>is index of Audio mode, Response: OK/ERROR When <type>=4, <value> must be input: <value>the type of Audio device mode Response: OK/ERROR
Command	AT+SADM=?
Response	+SADM: (0-12), OK

<type> action type

<type>	Description
0	Get the number of Audio mode.
1	Get the name of Audio mode.
2	Get the data of Audio mode.
3	Set the data of Audio mode.
4	Set Audio device mode.
5	Save the data of Audio mode to NV.

<n> Number of Audio mode

<index> Index of Audio mode

<name> Name of Audio mode in character string format

<data> Data of Audio mode, value of HEX format character string

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Appendix A Data / Commands multiplexing protocol

Introduction

The FLY280 multiplexing protocol operates between a DCE (Data Communication Equipment: the product) and a DTE (Data Terminal Equipment). It allows a double session over a serial link interface：one for AT commands and one for DATA communications. In Multiplexing Mode, AT commands and DATA are encapsulated into packets. The header of these packets allows to recognize whether it is a DATA packet or an AT command packet.

AT+SMUX=1 activates the Multiplexing Mode. With this mode, AT commands and DATA are encapsulated into packets. The header of these packets allows to recognize whether it is a DATA packet or an AT command packet. AT+SMUX=0 deactivates the Multiplexing Mode and gets the product back to the default mode.

AT command packets

An AT command is encapsulated into a packet with a header which allows to separate it from DATA packets. This packet is formed by a header (3 bytes), the AT command itself and a checksum (1 byte) :

B7	B6	B5	B4	B3	B2	B1	B0
Start pattern → 0xAA							
AT command length LSB							
AT command pattern → 0x1D				AT command length MSB			
Data bytes							
Checksum							

The 3 bytes of the header are:

- the first byte (0xAA) is used to identify the packet,
- the second byte represents the 8 LSB (Low Significant Bits) bits of the length of the AT command,
- the third byte is made of 2 parts :

- the 3 LSB bits are the 3 MSB (Most Significant Bits) bits of the length of the AT command,

- the 5 MSB bits (0x1D which equals to 0xE8 with the 3 bits offset) are used to identify an AT command.

The maximum length of an AT command could be 2047 bytes which is greater than all the existing AT commands.

The checksum is the addition (modulo 256) of all the transmitted bytes (header bytes and AT command bytes).

Data packets

Like for AT commands, DATA are encapsulated into packets. These packets are composed of a header (3 bytes), the data bytes and the checksum (1 byte) :

B7	B6	B5	B4	B3	B2	B1	B0
Start pattern → 0xDD							
Data packet length LSB							
Data packet type				Data packet length MSB			
AT command							
Checksum							

The 3 bytes of the header are:

- the first byte (0xDD) used to identify the packet,
- the second byte represents the 8 LSB bits of the length of the data field,
- the last byte is made of 2 parts :

- the 3 LSB bits represent the 3 MSB bits of the length of the data field,
- the 5 MSB bits represent the packet type.

Data packets can have different values according to the type of packet:

- 0 . DATA packet : the packet contains the data to transmit on the radio link or received from the radio link,
- 1 . STATUS packet: the packet contains the status of SA, SB, X bits(1) and the break condition coding as follow :

SA	SB	X	BRK	RI	Spare	Spare	Spare

- the length of data for the status packet is always equal to 1,

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- whenever a status changes (except break), all the status bits are included,
- these bits are off by default (and therefore the bits DTR and RTS), so it is necessary to send a status packet to the target at the beginning of the multiplexing to start the transmission,

1 These status bits contain the V24 control information :

- SA contains DTR (signal CT108 . from terminal to IWF) and DSR (signal CT107 . from terminal to IWF),
- SB contains RTS (signal CT105 . from terminal to IWF) and DCD (signal CT109 . from IWF to terminal),
- X contains CTS (signal CT106).

For more information, refer to GSM 07.02

- 2 . READY packet : the packet indicates that the target is ready to receive data :
- no data are transmitted in this packet (so the length is null),
- 3 . BUSY packet : the packet indicates that the target is busy and can not receive data :
- like the ready packet, no data are transmitted,
- other values : currently, these values are not used (reserved for future enhancement).

The checksum is calculated like the AT command packet checksum (addition of all the transmitted

bytes including the header bytes).

Examples:

Appendix A 1. AT command and its answer

When there is no encapsulation the AT command transmitted on the serial link is like this (in ASCII and hexadecimal):

AT\r\n ↔ 0x41 0x54 0x0D 0x0A

and the answer is like this :

\r\nOK\r\n ↔ 0x0D 0x0A 0x4F 0x4B 0x0D 0x0A

With the encapsulation in the serial link, the packet transmitted is (in hexadecimal) :

0xAA 0x04 0xE8 0x41 0x54 0x0D 0x0A 0x42

and the answer is like this :

0xAA 0x06 0xE8 0x0D 0x0A 0x4F 0x4B 0x0D 0x0A 0x60

Appendix A 2. Initialisation and Data packet

When the Multiplexing Mode is activated (+SMUX=1), the product sends 2 Data packets after the establishment of a DATA call (after the CONNECT xxxx message) : 1 READY

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Packet and 1

STATUS Packet. To set the different signals to the right value, it is necessary to send a STATUS

packet to the product.

Here are some examples of STATUS packets :

0xDD 0x01 0x08 0x40 0x26 ↔bit RTS is on

to start a data call, all the bits should be on :

0xDD 0x01 0x08 0xC0 0xA6 (bits DTR and RTS are on

Error manage

When received data checksum is error ,we should discard the firs three byte, Start pattern, Data length and Data packet type, then find “0xAA” or “0xDD” to start the next data frame. If you do this action, you will skip the error data frame and get next correct frame start byte that maybe “0xAA” or “0xDD”.

The high layer protocol will guarantee the error data to be resend.

Restriction

The autobauding mode is not available when the Multiplexing Mode is activated ： the serial link speed must be set to a fixed rate.

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Appendix B Revision History

Version	Date	Owner	Notes
1.0.0	2011-10-12	Eric	Created
1.0.1	2012-01-13	Eric	Add Appendix A Data / Commands multiplexing protocol
1.1.0	2012-3-26	Eric	Change the logo, add 1.6 SIM Insertion, SIM Removal；1.7 Background initialization

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